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Determinants of unemployment duration in Ukraine

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This paper presents first evidence on the determinants of unemployment duration in Ukraine between 1997 and 2003, using individual-level data from the first wave of the Ukrainian Longitudinal Monitoring Survey (ULMS-2003). It investigates the conditional probability of an individual leaving unemployment to employment or economic inactivity in any particular month of his spell out of work by estimating it in a discrete time independent competing risks framework with flexible baseline hazard rates and gamma-distributed unobserved heterogeneity. The results in all specifications indicate no significant effect of receiving unemployment benefits but significant negative effect of having income from casual activities, subsidiary farming, household income or pension on the hazard of re-employment. Multivariate analysis also suggests that policies to reduce long-term unemployment should focus on older workers, less educated individuals, residents of small towns and rural area in the regions with relatively high unemployment rates.

Keywords. Ukraine, long-term unemployment, unemployment insurance, semiparametric duration analysis, flexible baseline hazard.

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NON-TECHNICAL SUMMARY

The persistent and stagnant character of unemployment over the last decade in Ukraine has become an overwhelming concern for policymakers and for society in general. The problems of unemployment are aggravated even more because the incidence of long-term unemployment and the average duration of unemployment appear to have decreased slowly in response to increases in labor demand in previous years. This implies that there are potentially serious barriers existing between long-term unemployed and new job opportunities. Consequently, one possible way to tackle the problem of long-term unemployment in Ukraine is to combat the inflow into long-term unemployment by offering more assistance to job losers before they reach the stage of long-term unemployment (*i.e*. preventive measures). A second important way is to apply measures focused on the needs of the more disadvantaged groups which aim at reducing the existing stock of chronic unemployed. In this context, it is of vital importance to understand the forces which tend to shape the structure of unemployment duration and its dynamics in order to properly design the social and economic policy model. The main purpose of this study is to determine factors which affect the probability of reemployment or withdrawing from the labor force after a period of unemployment in Ukraine over the last years. In particular we look at the impact of unemployment benefits and alternative sources of income during an unemployment spell, various individual and local labor market characteristics.

The theoretical framework of our empirical study is job search approach. This paper builds on previous works in developed countries by estimating the conditional probability of leaving unemployment in a discrete time independent competing risks framework with flexible baseline hazard rates and gamma-distributed unobserved heterogeneity. The data base is a sample of unemployment spells experienced by individuals over the period December 1997 – June 2003 from the first wave of the Ukrainian Longitudinal Monitoring Survey (ULMS-2003).

In this study we test several basic hypotheses, namely about insignificant impact of receiving unemployment benefits on the probability of leaving unemployment, about disincentive effect of income from casual activities, subsidiary farming or other alternative sources of subsistence, about significant impact of individual characteristics (demographic attributes, measures of human capital and previous labor market history) and labor market (local and national) conditions. Our results suggest that on average low non-employment benefits in Ukraine cannot be considered as the significant determinant of unemployment duration in contrast to empirical evidence in many developed and transition countries. However, the possibility of receiving income from different casual activities or subsidiary farming, labor market age discrimination, occupational and geographic imbalances can potentially explain the stagnancy of unemployment in Ukraine.

Our findings provide important implications for policymakers. Firstly, policies aimed at mitigating long-term unemployment should focus on older workers, less educated individuals, residents of

small towns and rural area in the regions with relatively high unemployment rates. It is important to stress that all active labor market policies need to be wary of the temptation to 'cream off' those easiest to help at the expense of disadvantaged groups. Such policies should encourage registration and participation of unemployed from the vulnerable groups and address the full range of their needs. And finally, it is necessary to pursue an economic and social policy which promotes full, productive and freely-chosen employment. This would encourage people to move from inefficient to efficient jobs, from depressed areas to developed regions, from informal casual activities towards the formal sector, and from unemployment to regular jobs.

1. INTRODUCTION

One of the dramatic consequences of aggressive market-oriented reforms in Ukraine after 1994 has been a surge of open unemployment, from its virtual absence in the early 90-s to double digits in the late 90-s (Table 1). Not only the levels of unemployment and employment, but also the transition rates among different labor market states have been severely affected: the probability of entering unemployment after regular employment has substantially increased, especially for the workers of the former state enterprises, while the probability of finding a job after an unemployment spell has declined.[1] As a result, the proportion of unemployed who have been out of work for a long time has increased considerably in Ukraine leading to persistent and stagnant unemployment. According to the Ukrainian Labor Force Survey, on average about 984 thousands of persons (50.3% of all unemployed) in 2003 have been out of work and actively searching for it for more than a year (Table 3). And many others are at risk of becoming so. This feature of the Ukrainian labor market, known in the literature as the high incidence of long-term unemployment, is one of its most disturbing developments over the last decade.[2]

There are several reasons to be concerned about these trends from economic and social viewpoints. Firstly, long-term unemployment severely affects both individual and public budgets. For unemployed persons, extended periods of joblessness may result in partial detachment from the labor market, depreciating human capital, and increasing chances of poverty (Machin and Manning, 1999). Public budgets suffer because of loss of tax revenues and increasing expenditures on unemployment and social benefits. Secondly, long-term unemployment may have undesirable impact on psychological well-being of the unemployed individuals: they feel lonely, isolated and stigmatized, lose self-esteem, and rely on family and friends for support and company, feeling that their wider societies have unsympathetic and prejudiced views (Feather, 1990).

Whilst intuitively it may seem obvious that creating new jobs is the key to tackling long-term unemployment, empirical evidence in many developed countries suggests that there is no clear relationship between local job creation and falling long-term unemployment (OECD, 1993 and 2002). Nor is there a relationship between job loss and rising long-term unemployment. Machin and Manning (1999) conclude that the rise in the incidence of long-term unemployment and high unemployment rates seen in the bulk of European countries in recent decades has been associated with an increase in the average duration of unemployment due to low outflow rates at all durations of unemployment, rather than with an increase in the inflows to unemployment.

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[1] The gross transition probability matrix between December 2001 and December 2002 in Table 2 suggests that less than 25% of those who were unemployed in December 2001 became employed till December 2002 while about 67.7% of initially unemployed remained in this state in a year. Unfortunately, we can't precisely estimate gross transition probability matrix for the early 90-s because of the lack of necessary data at hand. Instead, we refer the reader to the analysis of inflows and outflows from registered unemployment in Ukraine based on administrative macrodata (Kuzmin *et al*., 2003).

[2] High incidence of long-term unemployed is peculiar also to many European OECD and transition countries (OECD, 2002).

Table 1. Main labor market indicators in Ukraine, 1995–2003*

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Registered unemployment									
Number of registered unemployed, thds.	126.9	351.1	637.1	1003.2	1174.5	1155.2	1008.1	1034.2	988.9
Registered unemployment rate, % of working-age able-bodied population	0.46	1.27	2.33	3.69	4.3	4.22	3.68	3.80	3.6
Fraction of registered unemployed receiving Unemployment benefits, %	57.4	61.1	56.8	53.1	52.8	64	66.1	73.2	80.6
ILO-defined unemployment									
Number of unemployed according to LFS, thds.	1437.0	1997.5	2330.1	2937.1	2698.8	2707.6	2516.9	2301.0	2059.5
Unemployment rate according to LFS, % of labor force aged from 15 to 70	5.6	7.6	8.9	11.3	11.9	11.7	11.1	10.1	9.1
Employment									
Number of employed according to LFS, thds.	24125.1	24114.0	23755.5	22998.4	20048.2	20419.8	20238.1	20400.7	20554.7
Employment rate according to LFS, % of population aged from 15 to 70	64	64	64.5	62.8	54.9	56.1	55.8	56.2	56.6
Labor Force and Population									
Labor force, thds.	25562.1	26111.5	26085.6	25935.5	22747.0	23127.4	22755.0	22701.7	22614.2
Labor force participation Rate, % of population aged from 15 to 70	67.85	69.31	70.81	70.77	62.27	63.53	62.71	62.57	62.33
Population, thds.	51297.1	50818.4	50370.8	49918.1	49429.8	48923.2	48457.1	48003.5	47580
Wages and UB									
Average nominal wage, UHA	73	126	143	153	178	230	311	376	462
Average Unemployment benefits, UHA	NA	NA	NA	NA	NA	59.39	85.23	105.98	118.32
Ratio of average Unemployment benefits to minimum wage, %	NA	NA	NA	NA	NA	50.3	72.2	64.2	57.7
Ratio of average Unemployment benefits to average wage, %	NA	NA	NA	NA	NA	25.8	27.4	28.1	25.6

Note: * — Registered unemployment characteristics correspond to the end of years, while characteristics according to the LFSs are presented for the fourth quarters in 1995–1998 (yearly surveys) and on average for 1999–2003 (quarterly surveys).

Source: Derzhkomstat (Ukraine's State Committee of Statistics).

Table 2. Labor market transition probabilities in Ukraine from December 2001 to December 2002 (%)

Origin state (Dec. 2001)	Destination state (Dec. 2002)		
	Employed	Unemployed	Inactive
Employed (E)	90.30	4.96	4.81
Unemployed (U)	24.56	67.74	7.70
Inactive (OLF)	4.77	2.06	93.16

Note: $N_{E\_2001} = 4135$, $N_{U\_2001} = 623$, $N_{OLF\_2001} = 3877$. Gross probability of transition from state *i* to state *j* is calculated as the ratio of the number of individuals in state *i* in December 2001 who are in state *j* in December 2002 to the original stock of individuals in state *i* in December 2001, assuming that movements between states are governed by a Markov process (see Bellman *et al*., 1995, for discussion about the application of this method in transition countries).

Source: ULMS-2003, author's calculations.

Table 3. Duration of unemployment in Ukraine

	2000	2001	2002	2003
Number of unemployed, who were searching for a job or were planning to start business, thds.	2628.7	2431.3	2204.3	1965.3
Percentage of those searching for a job or planning to start business by duration of their job search				
Less than 1 month	3.1	3.0	2.7	3.1
1–3 months	10.1	11.0	12.4	13.8
4–6 months	11.0	11.0	11.6	12.8
7–9 months	12.2	10.1	10.0	10.5
10–12 months	13.1	10.1	9.8	9.5
More than 12 months	50.5	54.8	53.5	50.3
Average duration of job search, months	10	10	10	9
Average duration of non-employment, months	23	23	22	22
Average duration of registered unemployment, months	11	9	8	7

Source: Derzhkomstat, LFS (except for information on duration of registered unemployment).

The fact that incidence of long term unemployment tends to fall only slowly in response to increases in the labor demand lends support to the view that there are serious barriers standing between long-term unemployed people and job opportunities implying that long-term unemployed

are not effective competitors in the labor market (Layard *et al.*, 1991; Bean, 1994). These barriers include, among many others, the following:

- people who have been unemployed for a long time not having the skills to meet the requirements of new jobs created in the economy (Pissarides, 1992);
- employer recruitment channels mean vacancies may not come to the notice of long-term unemployed people since the unemployed lose important social contacts as their spells lengthens (Machin and Manning, 1999);
- discriminative recruitment practices: employers may use unemployment duration as a signal of worker's productivity on which to base employment decisions 'ranking' job applicants by unemployment duration (Blanchard and Diamond, 1994);
- high labor turnover costs due to employment security regulation reducing the number of job opportunities that become available (OECD, 1993);
- loss of motivation, stigmatization, social isolation and poverty leading to ever-diminishing chances of finding work as unemployment lengthens (Feather, 1990);
- domestic and personal circumstances such as poor health, child or other members of family care difficulties, *etc*.

Given this, one possible way to tackle the problem of long-term unemployment in a country is to combat the inflow into long-term unemployment offering more assistance to job losers before they reach the stage of long-term unemployment. In this context, in order to properly design the social and economic policy model that should, on the one hand, alleviate the growing problem of long-term unemployment and, on the other hand, promote an efficient reallocation of resources, it is important to understand the forces which tend to shape the structure of unemployment duration and its dynamics.

What are the factors that determine the probability of leaving unemployment in Ukraine? Does the Ukrainian unemployment insurance system discourage quick exits to employment or some other factors come into effect instead? What individuals are most exposed to long-term unemployment? These are the questions we attempt to answer in our study whereby filling gap in the literature on determinants of unemployment duration in Ukraine. The main purpose of this study is, therefore, to examine factors which affect the probability of reemployment or withdrawing from the labor force after a period of unemployment in Ukraine over the last years.

We use individual data from the first wave of the Ukrainian Longitudinal Monitoring Survey (ULMS), which contains rich information about the individual's labor market history, geographical mobility, history of studies and changes in marital status owing to its retrospective nature. These data provide accurate information on unemployment spell duration and other important characteristics for 1799 individuals over the period 1997–2003. Although we follow the ILO (1982) guidelines on defining the unemployed as persons above a specified age who are without work, looking for work and available for it during a given period of time (so called three basic criteria of unemployment), the definition of unemployment accepted in our study differs from the standard

ILO definition due to retrospective nature of the data with a long recall period.[3] Firstly, definition of the three labor market states employed in our study refers to the 'usually' employed, unemployed or economically inactive rather than to the 'currently' employed, unemployed or economically inactive individuals. Secondly, according to the standard ILO unemployment criteria individuals who engage in casual work or casual business activities can not be classified as unemployed. We do not exclude individuals on the basis of their engagement in irregular businesses from the sample of unemployed if they satisfy the three basic criteria of unemployment (didn't work, were looking for work and available for it) but point to income from casual work as one of the sources of subsistence during a period of non-employment. The reason for this is that we assume that most such 'usually' unemployed individuals with income from casual work would have preferred a regular job and would have accepted a reasonable job offer, and so they can be classified as unemployed.[4] Moreover, it is impossible to capture accurately the extent and the nature of casual short-term activities within a long period of non-employment using the retrospective data from the ULMS. Thirdly, we do not restrict our sample of unemployed individuals on the basis of methods of their job search (passive versus active) because most individuals in our sample have indicated a number of job search methods, both active and passive.[5]

Some of the unemployment entrants subsequently leave this labor market state to employment or inactivity within a few weeks, while others tend to remain unemployed during several years. Some persons experience unemployment only once during the observed period, while the others may have from two to five unemployment spells. There is, therefore, enormous variation in the duration of unemployment spells across individuals in our sample, which allows us to analyze the underlying causes of these striking differences. Competing risks of exits to employment and to inactivity are estimated by using the discrete-time complementary log-log model with a fully flexible nonparametric specification of the baseline hazard and comparing it to the alternative approaches, the discrete-time complementary log-log model with polynomial form of the baseline hazard and continuous-time Cox partial likelihood proportional hazards model. Our model along with other flexible duration models yields more robust results than those obtained from commonly used Weibull or other parametric models (Meyer, 1990; Han and Hausman, 1990). In our estimation we allow for gamma-distributed unobserved heterogeneity but it appears to be not important since explicitly modeling unobserved heterogeneity changes the covariates little.[6]

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[3] Following the ILO methodology, students, pensioners, homemakers and others mainly engaged in non-economic activities during the reference period who satisfy the three basic criteria of unemployment are regarded as unemployed in our study on the same basis as other categories of unemployed persons.

[4] Sabirianova (1998) has estimated that in the case of Russia unemployment rate according to the standard ILO definition should be corrected (increased) by 1–2% if the unemployment sample is augmented with the number of non-employed individuals which had casual income during a period of job search.

[5] Further discussion of the definition of unemployment used in our study can be found in Section 4.4.

[6] The empirical work of Meyer (1990) and of others suggests that when the baseline hazard is fully flexible, failure to model distribution of unobserved heterogeneity explicitly does not seriously bias results.

We get empirical support to our hypotheses: individuals receiving unemployment benefits do not have significantly different duration, while those who have income from casual work activities and subsidiary farming or rely on household income or pension remain unemployed considerably longer before finding a regular job. We have found also that the exit to employment decreases with age; gender doesn't play significant role in determining unemployment duration; married are more likely to leave unemployment to employment than unmarried persons while married women tend to remain unemployed longer; unemployed with higher education experience shorter unemployment spells than individuals with unfinished secondary education or lower education level; previous labor market history appears to not influence significantly the probability of re-employment; the residents of large cities tend to have higher exit rates to jobs than residents of rural area or small towns; the higher regional unemployment the lower the probability of re-employment; and finally, economic growth in Ukraine during the last years seems to be not fully reflected in the dynamics of outflows from unemployment to regular jobs. Analysis of the determinants of unemployment duration before withdrawing from the labor force suggests that individuals over the age of 40 are more likely to leave unemployment for inactivity than those aged 24 or under; those who rely on household income or pension have higher exit rates into inactivity; residents of small to medium towns and those who enter unemployment after employment tend to have longer unemployment spells before withdrawing from the labor force; and those who entered unemployment relatively recently tend to have significantly shorter unemployment spells than those who became unemployed in earlier years.

Our results imply that policies aimed at mitigating long-term unemployment and encouraging regular employment should focus on older workers, less educated individuals, residents of small towns and rural area in the regions with relatively high unemployment rates. The measures to alleviate the long-term unemployment can be divided into two main groups: the first package of policies consists of preventive measures, while the second one aims at tackling long-term unemployment among those who have already became long-term unemployed.

The paper is set up as follows. Section 2 provides a short overview of the literature on the determinants of unemployment duration in transition countries. Section 3 discusses shortly the working of the unemployment insurance system in Ukraine and implied inferences. Section 4 offers description of the theoretical framework for modeling unemployment duration, the econometric model, and of the data employed in our analysis, and discussion of some methodological issues. Our estimation results are presented in Section 5. Finally, Section 6 offers concluding comments and policy implications.

2. UNEMPLOYMENT DURATION IN TRANSITION COUNTRIES: LITERATURE REVIEW

After more than ten years after the start of transition in the CEE and CIS countries, there is still considerable debate about the different labor market adjustment paths in the CEE versus CIS

countries. Why, on the one hand, these countries with almost similar initial conditions can be characterized by roughly similar pattern of GDP with strong declines after the introduction of political and economic reforms and its gradual growth after the positive sign of recovery, while on the other hand, responsiveness of employment to output changes and unemployment dynamics are so much different? Why unemployment pools of many transition countries are so stagnant despite the rapid transformations taking place? What can explain the differences in the unemployment experience even within specified groups of countries? In trying to tackle these issues, Boeri and Terrell (2002) and Boeri (2001) argue that many of these puzzles can be partly explained by labor supply factors and the role played by non-employment benefits.[7] As they point out, the CEE countries adopted social policies with higher levels of non-employment benefits that created a wage floor whereby affecting the distribution of earnings. On the one hand, this wage floor forced to release unproductive resources for more productive activities translated in the relatively large growth rates, but on the other hand, it favored a large drive to non-employment and the spread of long-term unemployment due to low outflow rates from unemployment to jobs. In the CIS, on the contrary, the costs of labor are much lower because non-employment benefits are very low, and various specific adjustment mechanisms such as wage arrears, unpaid leave, reduced working week and payment in-kind are extensively used (as documented by Lehmann *et al.*, 1999 and Earle and Sabirianova, 2000). These low labor costs imply that labor hoarding is still existent in many enterprises, especially in the state sector, and that the reservation wage is also very low. So, while low labor costs impede "creative destruction", they also mean that outflows from unemployment are relatively large and that unemployment is less stagnant (Boeri and Terrell, 2002).

However, the idea that there are large outflows from unemployment in the CIS is an assertion that is based mainly on the evidence for Russia in the early period of transition (*e.g.* Commander and Coricelli, 1994; Commander and Yemtsov, 1994; or Foley, 1997*b* for 1992–1993). Denisova (2002) argues that unemployment in Russia during the last years appears to be stagnant, with the ratio of long-term unemployed in unemployment pool of more than thirty percent. Data presented in Tables 2 and 3 suggest that Ukraine also faces an increasingly severe problem of long-term unemployment. So the picture of a large turnover in the pool of unemployment envisaged by Boeri and Terrell (2002) for CIS countries appears to be not very accurate in the case of Ukraine. It seems that the labor market adjustment path in Ukraine may extend a number of puzzles of transition and so makes a particularly interesting case for investigation. On the one hand, low labor costs due to low non-employment benefits and high wage flexibility hinder fast effective labor reallocation like in Russia.[8] On the other hand, low unemployment benefits and social assistance have not resulted in the large outflows from unemployment — unemployment in Ukraine has becoming stagnant as in the CEE countries. In this study, we try to shed some light on the effect of non-employment

[7] Non-employment benefits include unemployment benefits, social assistance, early retirement, liberal access to invalidity pensions, *etc*. (Boeri and Terrell, 2002).

[8] Extensive analysis of unemployment in Russia and its comparison with other transition countries is provided in Kapelyushnikov and Vishnevskaya (2003).

benefits, supply- and demand-side factors on the exits from unemployment in Ukraine, whereby contributing to the debates about the different labor market adjustment paths in CEE and CIS countries.

Trying to answer the question what explains the differences in the unemployment experience of the Czech Republic and the other CEE economies, policy makers and researchers noted that the most important reason for the lower unemployment rate in the Czech Republic was its considerably higher outflow rate from unemployment. Consequently, an analysis of the determinants of outflows from unemployment has become the key to understanding the unemployment issues in transition countries and so it has provided a fertile ground for academic research.

The researchers use individual data to estimate the relative effects of various variables, including demographic characteristics, local labor market conditions, characteristics of the unemployment benefit system on the probability of exit from unemployment. Ham *et al.* (1998) investigate the nature and causes of the differences in exit rates from unemployment between the Czech and Slovak republics during 1991–1993. The authors find that more than one-third of this difference for those who do not receive unemployment benefits (and about one half for recipients) is explained by differences in the values of explanatory variables. Differences in the explanatory variables arise mainly from differences in the level of local demand variables and the district industrial employment structure in the two republics for recipients, and from the differences in demographic characteristics for non-recipients. The remaining difference in expected unemployment duration in the two republics is accounted for differences in estimated coefficients of the hazard functions. The second basic finding of Ham *et al.* (1998) is that the level of unemployment compensation has moderate negative effects on the duration of unemployment in both republics, compared with the corresponding estimates in western countries. The authors find also that gypsies and disabled have a much longer unemployment spells than others in each republic, while the effects of other demographic characteristics on the probability of moving from unemployment are quite different.

In a related line of research, most other studies in the CEE transition countries are focused on the responsiveness of unemployment duration to the features of unemployment benefit system.[9] The motivation for this increased interest is that there has been much policy discussion about the impact of unemployment benefits on unemployment in developed and transition countries during the recent decade (OECD, 1993 and 2002) because unemployment benefits are considered an important factor affecting the incentive to work. The disincentive effects of unemployment benefit systems with respect to transitions from unemployment to jobs are also important in the context of the debate over differences in characteristics of unemployment between European countries and the United States (Bean, 1994).[10] Most findings of the studies in transition economies are consistent with job search theory implications and empirical evidence in the Western countries: the exit rate from

[9] See Lubyova and van Ours (1997, 1999) for Slovakia, Micklewright and Nagy (1996) for Hungary, Vodopivec (1995) for Slovenia, Carpetta and Cazes (1997) for Bugaria and Poland, among many others. Review of the studies on the determinants of unemployment duration and labor market transitions in the CEE countries can be found in Svejnar (1999).

[10] See Atkinson and Micklewright (1991) and Devine and Kiefer (1991) for a survey of that research in developed countries. There is a wide variety in the characteristics of the studies performed such as data, explanatory variables, specifications for duration distribution, number of destination states, taking unobserved heterogeneity into account, *etc*.

unemployment to jobs is lower for married females, less educated, older individuals living in small towns or rural area in the regions with relatively tight labor markets. The studies point to labor demand factors as well as various characteristics of individuals, firms and labor market institutions as determinants of unemployment duration and conclude that the generosity of unemployment compensation systems has only a moderately negative or insignificant effect in terms of lengthening an unemployment spell.

As far as analysis of the determinants of unemployment duration and of the effect of unemployment benefits in the Former Soviet Union Republics is concerned, most of not numerous studies are focused on Russia. Foley (1997*a*) and Grogan and van den Berg (1999) assess the determinants of duration of unemployment (defined according to the ILO criteria) in Russia by using data from the RLMS (1992–1994 and 1994–1996, respectively) and estimating various hazard models. Foley finds that married women experience longer durations than married men; older persons can expect to be unemployed longer than younger individuals; residents of regions with higher unemployment rates have longer unemployment spells; and that there is evidence of duration dependence of unemployment, but not monotonic. Grogan and van den Berg find the same influence of local labor demand conditions on the duration of unemployment and non-monotonic duration dependence as Foley, but no age group effect on duration and higher exits rates among women than among men. It is worth noting also that the impact of education on the duration of unemployment spell in Russia as well as in Ukraine is still an open question. Many authors analyzing registered unemployment in Russia (Nivorozhkina *et al.*, 2002; Denisova, 2002) point to relatively longer unemployment spells for those with higher education attributing this phenomenon to the smaller number of suitable jobs in the bank of vacancies in the Public Employment Service for better-educated registered unemployed as opposed to those with a lower level of education. Foley finds that better educated individuals do not seem to find jobs more quickly than the less-educated, while they appear to search longer when withdrawing from the labor force. Grogan and van den Berg find that those with completed higher education have relatively better chances to exit unemployment. Finally, Foley (1997*a*) finds no significant effect of receiving unemployment benefits on exit from ILO-defined unemployment, while Nivorozhkina *et al.* (2002) find significant negative effect of the level of unemployment benefits on the probability of leaving registered unemployment: those who receive the minimum level of unemployment benefits tend to leave the register faster than those who receive higher levels of unemployment benefits.

The only study in Ukraine that is related to our research has been done by Stetsenko (2003). The author examines the determinants of duration of the registered unemployment in Kiev using the registered data from the Kiev Employment Service from 2001 to 2003 and employing Cox proportional hazard and piece-wise constant exponential models. The author finds significant positive effect of the amount of unemployment benefits on the duration of registered unemployment. Younger workers and males are more likely to leave the register to both competing destinations (to job and for other reasons out of the register) than older individuals or female; being married significantly decreases the probability of transition to employment for women; individuals with less than general secondary education have higher probability of transition to employment

relative to individuals with higher level of education; having profession increases chances to get a job; and unobserved heterogeneity doesn't seem to be important.

Little is known, however, about determinants of real unemployment in Ukraine, which has much larger incidence and duration than registered unemployment (Tables 1 and 3). And this is the subject of our study. But before we proceed to the empirical part of our work, we briefly discuss the working of the unemployment insurance system in Ukraine in order to justify our main hypotheses.

3. THE CHALLENGE FOR THE UNEMPLOYED IN UKRAINE: UNEMPLOYMENT INSURANCE OR ALTERNATIVE SOURCES OF SUBSISTENCE?

Public Employment Service (PES) and unemployment benefit system have been established in Ukraine according to the Law on Employment in 1991 when Ukraine was one of the republics of the Soviet Union. So despite many amendments to the Law in independent Ukraine during 1991–2003, there are still many similarities in regulations connected with unemployment between Ukraine and other FSU countries.[11] As in most countries, from the very beginning of transition Ukrainian government has set workplace standards like minimum wage and working time, protections for most vulnerable groups in the labor market, established rules for labor contracts, and introduced the measures to alleviate the problem of growing unemployment due to mass layoffs. Simultaneously with the use of passive income-support programs like unemployment benefits, unemployment assistance and early retirement scheme, through the network of the local public employment centers the state authorities have implemented active labor market policies (ALMP) such as public employment services (job placement assistance, and measures of so-called professional orientation including job information, job counseling, organization of job assistance seminars to the unemployed), training or retraining programs, temporary public-sector schemes, measures for most vulnerable groups at the labor market, interest-free loans to promote business start-up, and private-sector recruitment subsidies intended to create jobs (Kuzmin *et al.*, 2003; Kupets, 2000). Thus, PES in Ukraine as well as in the other countries is supposed to perform two major functions: to assist unemployed workers in their job search and to provide income support during a period of unemployment.

But it is widely believed that the Ukrainian PES is not very successful in both of the tasks. Firstly, although firms are obliged to register all vacancies with the PES and to make use of the PES in recruitment, due to weak law enforcement many firms fail to do this preferring other channels for recruitment. Besides, sometimes PES provides training or retraining for the skills that are already in surplus in the local labor markets, and public works are usually of low skill level (Kuzmin *et al.*, 2003; Kupets, 2000). So the probability of more effective matching and finding a good job with the

[11] Main institutional characteristics of the unemployment insurance system in Ukraine can be found in Appendix A1 or in Kuzmin *et al*. (2003).

help of the public employment center is small, while the transaction costs of registration and staying at the register are high.[12] Secondly, the level of unemployment benefits is too low: the ratio of the average unemployment benefits to the average wage in the economy is about 25–28%, while the ratio of the average unemployment benefits to the nationally established level of minimum wage fluctuates between 50–70% (see Table 1, bottom lines).[13] Moreover, because of the strict unemployment benefit eligibility criteria and high incidence of long-term unemployment, the coverage ratio (the ratio of those receiving unemployment benefits or unemployment assistance to the total number of unemployed in the register) has been about 53–66% during 1995–2001 and has increased to 80.6% in 2003. Although the unemployment insurance system in Ukraine may seem better than in the CEE countries from the viewpoint of incentives/disincentives to work, it is certainly worse in terms of income support of jobless workers and prevention of their falling into poverty.

For all these reasons, less than half of the actual jobless workers in Ukraine (defined according to the ILO unemployment criteria) bother to register as unemployed in the public employment offices (Table 1). Analysis of job search methods among unemployed in our sample (Table 4) indicates that people rely primarily on their direct contacts with employers, help of friends and relatives (having good contacts is very important to obtain a good job in Ukraine) and advertisements in the newspapers or Internet rather than on the assistance of the public employment offices.

This suggests that unemployment insurance system is not likely to play a significant role in determining duration of real unemployment in Ukraine. However, another explanation originated from the weak enforcement of the Labor Code and other laws in Ukraine and high payroll taxes is called into play. As in many transition countries, there are many possibilities for informal activities and unregistered employment in Ukraine, often casual and very short-term.[14] As has been documented by Mel'ota and Gregory (2001), the informal activity in the household sector in Ukraine amounts to about 16% of official GDP and presents the main source of the shadow economy in the country.

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[12] One of such transaction costs of staying at the register is a necessary visit (report) of unemployed to the local employment center once a month in the administrative center of their civil registration (new name of the old system of *propiska*). Since many people live far from administrative centers of their *propiska*, the above requirement demands too heavy expenses in terms of time and money.

[13] Although according to the Law the lower bound for unemployment benefits is the subsistence minimum (see Appendix A1), which is usually higher than the minimum wage, the actual unemployment benefits on average are much lower than even the minimum wage partly due to low previous official earnings and partly due to the smaller established subsistence measure which is used instead of the minimum wage or the subsistence minimum as a basis for calculation of all state provided benefits. Moreover, because of a strict and complicated scheme of calculation of the unemployment benefit size, which depends primarily on the reason of unemployment and duration of employment during the last year, the bulk of the registered unemployed are eligible only for the minimum level of unemployment benefits.

[14] According to Vodopivec (1995) and Grogan and van den Berg (1999), informal employment among unemployed is widespread phenomenon also in Slovenia and Russia, respectively.

Table 4. Job search strategies of the unemployed in 1997–2003 (% to all responses)

Asked relatives or friends	29.55
Responded to job advertisements	18.09
Placed job advertisements	1.93
Watched job advertisements	17.93
Contacted employers directly	16.06
Went to a job interview, took an exam or a test	1.83
Sought job through the State Employment Service	10.53
Sought job through private employment agency	1.59
Applied to register own enterprise/farm, for activity license or loan	0.32
Sought for land, rooms, equipment, employees, *etc*. to start an enterprise/farm	0.09
Waited for an answer to a job application	0.59
Waited for an answer from the State Employment Service	1.41
Waited for an earlier contracted job to start	0.07
Number of observations (unemployment spells)	2122
Number of responses	5584

Source: ULMS-2003, our sample, author's calculations.

Because of very low unemployment benefits accompanied with still relatively low labor demand, many people start some sort of self-employment just to survive, other leave the formal labor market preferring to find an informal activity or to rely on subsistence farming, and some persons withdraw from the labor market looking for additional sources of income like stipend, pension, child allowance, *etc*. Therefore, we suggest that there are likely individuals among long-term unemployed who search less intensively for regular job because they are occasionally engaged in unreported activities or subsistence farming which provide them sources of subsistence implying lower probability of receiving a job offer.[15] Additionally, alternative income during the period of unemployment raises reservation wage of such individuals whereby lowering the probability of then accepting the job offer and the probability of re-employment on the whole. However, the interpretation of this relationship between casual unreported activities and unemployment duration is also possible in the opposite direction: it is long-term unemployment that can force unemployed

[15] The most popular kinds of casual unreported activities in Ukraine according to the ULMS are transportation services, construction and repairing works, home tutoring and writing of term papers, sewing services and needlework, welding works and repair of vehicles, unskilled agricultural services for private households, and other personal services.

individuals to engage more actively in casual work activities or subsidiary farming. Various kinds of non-labor income during a period of unemployment including household income, state and private transfers, investments, savings, *etc*. are likely to have the same effect on duration of unemployment as casual labor income reducing the probability of reemployment and thereby extending the period of unemployment.

Tables 5*a* and 5*b* provide information on the distribution of responses on the main source of subsistence during a period of unemployment (aggregated to five main groups which will be used later in our analysis) and on the most 'popular baskets' of sources of subsistence among unemployed in our sample, correspondingly. As revealed by both of the tables, income of parents, a spouse or other relatives plays the dominant role in the support of unemployed individuals — nearly 69% of the unemployed in our sample point to household income as the main source of subsistence. Unemployment benefits account only for 4.5% of the sample as the main source (Table 5*a*), and they are combined most frequently with income of spouse (7.45%), income of parents (3.58%), support from relatives (2.78%), income from casual work (1.98%), income from sale of products from own land plot (1.51%) and subsidiary farming for own needs (1%).[16] It is worth noting also, that only 27.5% of those who receive unemployment benefits along with other sources of subsistence in our sample consider unemployment benefits as their primary income source during unemployment, while the bulk of unemployment benefit recipients mostly rely on household income, namely income of spouse (34.2%), income of parents (15%), and support from relatives (5.8%). Income from various casual activities or subsidiary farming constitutes the second largest group among the main sources of subsistence (13.7%); it may serve as the only source of subsistence as well as in conjunction with household income, unemployment benefits, pension, state transfers, and savings.

This analysis shows that the existent situation on the Ukrainian labor market hampers a rigorous study of the effect of the unemployment benefit system on unemployment duration, which could inform so essential decisions for policymakers. Instead, we just test the hypothesis that whether an unemployed individual receives unemployment benefit or no is not significant for his/her probability of exit from unemployment. At the same time, we hypothesize that existence of alternative sources of subsistence during an unemployment spell significantly extends a period of unemployment, though this factor can not be considered as of primary importance. Following Ham *et al.* (1998) and Arulampalam and Stewart (1995), we suggest that the factors from the labor demand side may be considered the dominant in explaining stagnancy of unemployment in Ukraine, but we should not forget also that supply-side determinants can be also at play (Boeri, 2001). Similar to many other transition economies, there are likely many displaced workers in Ukraine who may not find a new job easily because their skills acquired under the Soviet era are obsolete, they do not match new

[16] These are the figures for the baskets which include unemployment benefits and corresponding income source along with Other sources of subsistence in various combinations. Corresponding frequencies for the baskets only with unemployment benefits and one more income source can be found in Table 5*b*.

demand for labor, and these persons especially from the older age group are reluctant to retrain. Great difficulties for some groups of unemployed to find a new regular job accompanied with disincentive and discouragement effect may lead to long unemployment durations before re-employment or to higher outflows to inactivity. And we investigate to what extent this is the case in Ukraine in the rest of the paper.

Table 5*a*. Main sources of subsistence during a period of unemployment in Ukraine: 1997–2003

Source of Subsistence	Frequency	%
Unemployment benefits	96	4.52
Income from casual work	147	6.93
Income from sale of products from own land plot	64	3.02
Income from casual business activities	28	1.32
Subsidiary farming for own needs	51	2.4
Total for Casual work	290	13.67
Income of spouse	608	28.65
Income of parents	659	31.06
Support from relatives	190	8.95
Total for Household income	1457	68.66
Pension	137	6.46
Child allowance	12	0.57
Alimony	6	0.28
Social benefits, subsistence allowance	12	0.57
Supported by state or municipal institution	15	0.71
Total for State transfers	182	8.59
Sale of property	4	0.19
Income from rent, interests, dividends	3	0.14
Loans	2	0.09
Savings	62	2.92
Total for Other sources of subsistence	71	3.34
Number of observations	2122	100

Source: ULMS-2003, our sample, author's calculations.

Table 5*b*. Most 'popular baskets' of sources of subsistence during a period of unemployment in Ukraine: 1997–2003

Baskets of sources of subsistence	Frequency	%
Income of parents	348	16.41
Income of spouse	236	11.13
Unemployment benefits *and* Income of spouse *with* Other sources of subsistence	158	7.45
Unemployment benefits *and* Income of spouse only	88	4.15
Support from relatives	88	4.15
Pension	81	3.82
Unemployment benefits *and* Income of parents *with* Other sources of subsistence	76	3.58
Income of spouse *and* Income of parents	68	3.21
Income from Casual work *and* Income of parents	60	2.83
Unemployment benefits *and* Support from relatives *with* Other sources of subsistence	59	2.78
Income of spouse *and* Support from relatives	50	2.36
Income from Casual work *and* Income of spouse	48	2.26
Income from Casual work	46	2.17
Unemployment benefits	45	2.12
Income of parents *and* Support from relatives	43	2.03
Unemployment benefits *and* Income from casual work *with* Other sources of subsistence	42	1.98
Unemployment benefits *and* Income of parents	34	1.6
Stipend *and* Income of parents	34	1.6
Unemployment benefits *and* Income from sale of products from own land plot *with* Other sources of subsistence	32	1.51
Income from casual work *and* Support from relatives	31	1.46
Savings	30	1.41
Pension *and* Income from casual work, Sale of products from own land plot, or Casual business activities *or* Subsidiary farming *with* Other sources of subsistence	28	1.32
Income from sale of products from own land plot	26	1.23
Stipend during training *and* Income of parents	23	1.08
Pension *and* Income of spouse	23	1.08

Baskets of Sources of Subsistence	Frequency	%
Unemployment benefits *and* Subsidiary farming for own needs with Other sources of subsistence	21	1
Income of spouse *and* Child allowance	20	0.94
Income of spouse *and* Subsidiary farming for own needs	16	0.75
Income from casual work *and* Subsidiary farming for own needs	15	0.71
Income from sale of products from own land plot *and* Income of spouse	15	0.71
Unemployment benefits *and* Support from relatives	14	0.66
Income from casual work, Income of spouse *and* Income of parents	14	0.66
Income from casual business activities	14	0.66
Pension *and* Support from relatives	14	0.66
Income of parents *and* Savings	14	0.66
Unemployment benefits *and* Income from casual work only	12	0.57
Unemployment benefits, Income of spouse *and* Income of parents	12	0.57
Income from sale of products from own land plot *and* Income of parents	12	0.57
Income of spouse, Income of parents *and* Support from relatives	11	0.52
Support from relatives *and* Savings	10	0.47

Source: ULMS-2003, our sample, author's calculations. Only most frequent and most interesting baskets out of 256 various combinations are presented.

4. METHODOLOGY AND DATA

4.1. Theoretical model

The typical framework used in the empirical analysis of unemployment duration is the job search theory presented in Mortensen (1970) and Mortensen and Pissarides (1999). The theoretical model of job search in a two-state labor market (employment and unemployment) implies that when a worker becomes unemployed, the expected completed duration of unemployment spell ending in re-employment $\lambda(t)$ is influenced by the probability of receiving a job offer $\xi(t)$ (which could be further decomposed into a contact rate and an employer acceptance rate) and the probability then of accepting this job offer $\theta(t)$ determined by his/her reservation wage $r(t)$:

$$\lambda(t) = \xi(t, c(t))\ \theta(t) = \xi(t, c(t))\ [1 - F(r(t), t)],$$

where c is the search intensity of the worker, and F is the cumulative distribution function of wage offers facing unemployed individual of duration t. Thus the expected length of an individual's unemployment duration depends on the effort an individual makes to find a new job (job search intensity), the attractiveness of a person to an employer and local labor demand conditions, a wage offer distribution and the lowest acceptable wage, *i.e.* reservation wage (Machin and Manning,

1999). It is important to note that the reservation wage is not given as predetermined since according to the general model it is influenced by the individual's skill level (measured by the proportion of jobs open to him), the discount rate, and the level of unemployment benefits or guaranteed income available during unemployment which may vary directly or indirectly with duration *t* (Mortensen, 1970).

Since even the simple behavioral models relying on job search arguments place too many quite strong restrictions on the shape of duration distributions it is preferred to study unemployment durations using a reduced form approach (Jenkins, 2003) which implies that the total effects of the variables on the probability of re-employment are estimated rather than separate effects on the probability of receiving a job offer and probability of accepting a job offer:

$$\lambda\,(t) = \lambda\,(\mathrm{X}(t),\, t),$$

where X is a vector of characteristics which in a general model can vary with unemployment duration *t*. Vector of explanatory variables X may include local labor market conditions, measures of individual's human capital, demographic characteristics and health status, housing tenure, variables measuring various aspects of labor market experience prior to entering the unemployment spell, labor market status of spouse, income while unemployed and expected income in work, *etc*. (Devine and Kiefer, 1991). All explanatory variables are usually assumed to be exogenous parameters, *i.e*. that they are determined outside of the model. However, a strong caveat is required at this point. Although some variables could reasonably be expected to vary independently of the other variables included in the model (*e.g*. gender, age, race, nationality, *etc*.), *i.e*. to be truly exogenous, many explanatory variables are potentially endogenous. For instance, unemployment duration may influence marital status and number of children, labor market status of spouse, individual's health status, intensity of search for additional sources of subsistence, expected income in work, *etc*.

The job search theory predicts also that the re-employment probability may be negatively associated with the duration of unemployment spell (*negative duration dependence*) if, for example, discouragement effect takes place (the individual's search intensity declines as the unemployment spell lengthens if he perceives his re-employment prospects as hopeless), or because of human capital decay during long period out of regular job, or if employers screen unemployed individuals applying for job on the basis how long they have not been working (employers use unemployment duration as a signal of low productivity). It may be also positively associated with time (*positive duration dependence*) if, for instance, so-called resource effect takes place when the reservation wage (determined by the level of income while unemployed and the proportion of jobs open to an individual) is declining with unemployment duration. The reservation wage may decrease, for example, as exhaustion of unemployment benefits approaches (so-called unemployment benefit exhaustion effect) implying that the probability of re-employment rises until the point when benefits lapse, but the empirical evidence of this relationship is found to be ambiguous (Devine and Kiefer, 1991). Therefore, there are a variety of potential influences, one group of which implies negative duration dependence, while the other points to positive duration dependence. We will take this conclusion into account when we model the distribution of unemployment durations in the next subsection.

4.2. Econometric framework

The attention in modeling unemployment durations is usually focused on the conditional probability of leaving unemployment (*i.e.* the probability that someone leaves unemployment state for another state at time t given that the spell has lasted until time t), known as the hazard function $\lambda(t)$ (see Kiefer, 1988; Lancaster, 1990, for more details on duration models).[17]

Let T_i be the length of individual i's unemployment spell. If T_i is a random variable with the continuous density function $f(t)$, where t is a realization of T_i, the cumulative distribution function (the probability distribution of durations) can be specified as follows:

$$F(t) = \int_0^t f(s)ds = \Pr(T_i < t) .$$

Taking into account that some individual observations may be right-censored, the probability that the spell is of length at least t is given by the survivor function

$$S(t) = 1 - F(t) = \Pr(T_i \geq t) .$$

Then the *continuous-time hazard* (*rate*) for individual i at time t is defined by the equation:

$$\lambda_i(t) = \lim_{\Delta t \to 0} \frac{\Pr(t \leq T_i < t + \Delta t | T_i \geq t)}{\Delta t} = \lim_{\Delta \to 0} \frac{F(t+\Delta t) - F(t)}{\Delta S(t)} = \frac{f(t)}{S(t)} .$$

The hazard rate can be interpreted as the instantaneous probability of leaving unemployment in the interval $[t, t+\Delta t]$ for tiny Δt conditional on survival up to time t (that is not leaving unemployment before the beginning of this interval). It should be stressed, however, that the continuous-time hazard rate is not a probability since it does not follow all the properties of probabilities; in particular, it may be greater than one. The only restriction implied by its specification is that it should be non-negative.

The literature contains a wide range of models for the hazard rate using familiar duration distributions (Kiefer, 1988, among others). However, as we have discussed above, economic theory is not very informative about which of these alternatives are likely to be the best in particular application, for example, what distribution is the best to describe the relationship between the hazard rate of exit from unemployment and elapsed duration of unemployment spell. Evidently, erroneous assumptions on the form of the hazard rate can potentially bias the estimated effects. Therefore, it is important not to impose particular shape on the hazard function a priori.

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[17] Usually a number of simplifying assumptions are made in duration models (Jenkins, 2003): 1) no *state dependence* (the chances of making a transition from the current state do not depend on transition history prior to entry to the current state); 2) no "*initial conditions*" problems (entry into the state being analyzed is exogenous); 3) the process is *stationary* (the model parameters are fixed or can be parameterized using explanatory variables). For the moment, we also assume full independence of spells for the persons who experience multiple unemployment spells in our sample.

In order to summarize the data and get an idea on the shape of distributions of unemployment durations as a whole or for separate groups, we start our analysis with non-parametric estimation of the survivor and hazard functions relying on Kaplan–Meier product-limit estimators.

Let $t_1 < t_2 < ... < t_j < ... < t_k < \infty$ represent the survival times that are observed in the data set. Let d_j be the number of completed spells at t_j, let m_j be the number of observations censored in the interval $[t_j, t_{j+1})$, and let n_j be the number of observations ending their spell immediately prior to t_j , which is made up of those who have a censored or completed spell of length t_j or longer:

$$n_j = \sum_{i \geq j}^{K} (m_i + d_i) .$$

Then the Kaplan–Meier estimate of the survivor function is given by the product of one minus the number of exits (d_j) divided by the number of persons (observations) at risk of exit just before t_j (n_j):[18]

$$\hat{S}(t_j) = \prod_{j|t_j \leq t} (1 - \frac{d_j}{n_j}) .$$

However, the Kaplan–Meier estimated hazard assumes that there is no heterogeneity which can depend on observable or unobservable factors, *i.e*. that the sample is homogeneous. Therefore, after univariate analysis we proceed to multivariate parametric (or semi-parametric) duration analysis for the estimation of the joint effect of factors affecting the probability of exit from unemployment. A widely used way to allow for the presence of observed variables is to specify the proportional hazards model with the exponential form of the first term (Lancaster, 1979):

$$\lambda_i(t, X_i) = \exp(\beta' X_i(t)) \lambda_0(t) , \quad (1)$$

where X_i is a vector of explanatory variables for individual i, β is a vector of parameters to be estimated, and $\lambda_0(t)$ denotes a "baseline" hazard corresponding to the null values for the variables X assumed to be common to all persons (observations)[19, 20]. The proportional hazards property implies that absolute differences in X imply proportionate differences in the hazard at each t, or in other words, the proportionate change in the hazard for two groups is constant over the course of spell:

$$\frac{\lambda_i(\bar{t}, X_i)}{\lambda_j(\bar{t}, X_j)} = \exp[\beta'(X_i - X_j)] , \quad (2)$$

[18] Using *sts* command in STATA software it is easy to obtain the estimated Kaplan-Meier survivor function or related functions such as the Nelson-Aalen cumulative hazard function and weighted kernel smoothed hazard function. This command also allows comparing survivor or hazard functions across subgroups (by different individual characteristics) and testing the equality of survivor functions across specified subgroups (under the null hypothesis there are no subgroup differences in the survivor functions).

[19] For the moment, we suppose that there are no time-varying covariates. The rationale for this restriction comes from the existing problems of specifying, estimating and interpreting the models with time-varying explanatory variables (Kiefer, 1988).

[20] In one of our specifications we follow Cox (1972) in assuming an arbitrary form of the baseline hazard and applying the conditional-likelihood approach to estimate a vector of coefficients β. Although the function $\lambda_0(t)$ is not directly estimated in the Cox model, it is possible to recover an estimate of the baseline survivor function $S_0(t)$ and of the cumulative hazard function $H_0(t)$. See Han and Hausman (1990) for comparison of Cox's continuous-time specification and semiparametric discrete-time specifications.

where X_i and X_j denote vectors of characteristics for two persons i and j at some $t = \bar{t}$. The possible interpretation of the estimated coefficient β_k in the proportional hazards specification is that each coefficient summarizes the proportional effect of the absolute changes in the corresponding variable X_k on the hazard rate:

$$\beta_k = \partial \ln \lambda(t, X)/\partial X_k \ . \tag{3}$$

This means that the impact of the explanatory variables does not vary (in relative terms) with survival times. Alternatively, β_k can be interpreted as the elasticity of the hazard with respect to changes in Z_k where $X_k \equiv \ln(Z_k)$ (Jenkins, 2003).

Although the exit from unemployment may occur at any particular instant in time (the stochastic process occurs in *continuous time*), usually the data on unemployment spell lengths are not provided in that form: the observations are summarized discretely rather than continuously (Jenkins, 2003). Typically the data of interest are *grouped* (or *banded*) into numbers of weeks or months in unemployment or unemployment benefits entitlement, *i.e.* they are *interval-censored*. In other words, exact 'survival' times are not known for us, we know only that they fall within some interval of time. So we need to derive an estimate of parameters describing the continuous time hazard, but taking into account the nature of grouped survival time data. We follow Meyer (1990) in assuming that the hazard rate is parameterized using a proportional hazards form (see equation (1)). Then, the probability that a spell lasts until time $t + 1$ (measured in months) conditional on that it has lasted until t can be written as a function of the hazard:[21]

$$\begin{aligned} &\Pr\left[T_i \geq t+1 \middle| T_i \geq t\right] = \exp\left[-\int_t^{t+1} \lambda_i(u)du\right] = \exp\left[-\exp(\beta' X_i(t)) \cdot \int_t^{t+1} \lambda_0(u)du\right] = \\ &= \exp\left[-\exp(\beta' X_i(t) + \gamma(t))\right], \end{aligned} \tag{4}$$

$$\text{where } \gamma(t) = \ln\left[\int_t^{t+1} \lambda_0(u)du\right].$$

If our time axis is divided into a number of contiguous non-overlapping intervals $(a_{j-1}, a_j]$ for $j = 1, \ldots, k$, and each interval is of equal unit-length (months in our cases), *the discrete-time hazard rate* for individual i of exit in the interval $(a_{j-1}, a_j] = (a_j - 1, a_j]$, for the positive integers $a_j = 1, 2, \ldots$ can be written in *the complementary log-log form* as follows:

$$\lambda_i(a_j, X_{ij}) = 1 - \exp\left[-\exp(\beta' X_{ij} + \gamma_j)\right], \tag{5}$$

where X_{ij} is a vector of explanatory variables for individual i, β is a vector of parameters to be estimated, and γ_j is some functional form which summarizes the pattern of duration dependence in the discrete time hazard (parameters of γ_j are also to be estimated in the model).[22]

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[21] See Jenkins (2003) for a complete description.

[22] The likelihood is easily maximized by standard techniques in STATA.

We prefer a flexible specification of the baseline hazard since it allows for non-monotonic variation with duration, and therefore a wider range of possible effects of duration on the hazard rate can be captured (Meyer, 1990; Han and Hausman, 1990). Consequently, in our main specification we do not impose any restrictions on how γ_j vary from interval to interval, assuming specific parameter for each time interval (over which the model is specified) that is constant over that period (Meyer, 1990). In other words, we employ a flexible parametric (semiparametric) proportional hazards model: the baseline hazard is non-parametric while the effect of covariates takes a particular functional form.[23]

In this study we will distinguish between two destination states of exits out of unemployment: unemployment can end with finding a regular job, or with a spell of economic inactivity. The standard single-risk model defined above extended to two or more exit destinations is referred to in the literature as a competing risks model (Lancaster, 1990). Following the assumption made by Narendrenathan and Stewart (1993) for interval-censored data, that exits from unemployment can only occur at the interval boundaries and that risks are independent, the overall independent competing risks model simplifies to two or more single-risk models analogous to that for continuous time data.[24] To estimate the two risks separately in our model, exits from unemployment to inactivity are considered censored when estimating exits to employment, and vice versa.

Some researchers extend specified hazard models using random variables to allow for unobserved heterogeneity, which arises due to different duration distributions between individuals after controlling for the effect of all relevant observed factors (*e.g.* Foley, 1997*a*; Lubyova and van Ours, 1999, for transition economies). These random variables may be relevant because of potential measurement errors in observed predictors or survival times or because of some omitted variables in the model (Jenkins, 2003). According to Lancaster (1990), ignored unobserved heterogeneity (or 'frailty') in duration models can lead to misleading inferences about duration dependence (usually models not allowing for unobserved heterogeneity overestimate the degree of negative duration dependence in the hazard) and about the impact of included explanatory variables (in proportional hazard model the proportionate effect of a given predictor is no longer constant, and under the presence of unobserved heterogeneity estimate of positive β_k underestimates the 'true' estimate) due to biased estimates. Given this, to allow for unobserved heterogeneity in the context of a discrete-time proportional hazards model we extend our model (5) introducing a random variable v in each of the destination-specific hazard and assuming again the independence across terms:

$$\lambda_i(a_j, X_{ij} \mid v) = 1 - \exp\left[-\exp(\beta' X_{ij} + \gamma_j + u)\right], \tag{6}$$

where i is an individual identifier, a_j stands for duration interval, X_{ij} is a vector of explanatory variables for individual i, β is a vector of parameters to be estimated, γ_j is a function describing duration dependence in the discrete time hazard, and $u = \ln v$. In our model, v is a Gamma distributed random variable with mean one and finite variance θ, to be estimated from the model

[23] The other model estimated in our study uses a cubic polynomial specification of duration dependence, *i.e.* $\gamma_j = aj + bj^2 + cj^3$.

[24] An alternative assumption for the discrete-time competing risks model can be found in Han and Hausman (1990).

(Meyer, 1990). The likelihood-ratio test of H_0: $\theta = 0$ can be used to measure the degree of unobserved heterogeneity.[25]

4.3. Data and definition of variables

The data employed to analyze the duration of unemployment in Ukraine are taken from the first wave of the Ukrainian Longitudinal Monitoring Survey (ULMS), which was carried out by the Kiev International Institute of Sociology in April–June 2003 on behalf of the international consortium led by the Institute for the Study of Labor (IZA, Bonn, Germany). The ULMS is designed as a nationally representative random sample of the population of Ukraine living in private households in the spring of 2003, consisting of 4,056 households covering 8,641 individuals aged from 15 to 72.[26] The ULMS data set is a unique one in Ukraine since it is the first data set available at the individual (micro) level and owing to its retrospective nature it allows making a microeconometric analysis of unemployment duration from December 1997 till the reference week in 2003.

The ULMS is designed to measure the impact of the economic reforms after the collapse of the USSR on the welfare and labor market experience of the interviewed individuals in Ukraine. So like in many household-based longitudinal surveys, *e.g*. Russian Longitudinal Monitoring Survey (RLMS) or British Household Panel Survey (BHPS), the core of the individual questionnaire contains the usual questions related to the demographic characteristics, employment and non-employment, education, changes of residence, health and attitudes, while the household questionnaire consists mainly of the questions about structure of the household, its income and expenditures, and housing conditions. The specific feature of the individual questionnaire used in first wave of the ULMS, however, is that it contains *retrospective sections* where information is gathered about employment changes and non-employment periods in 1986, 1991, 1997 and during 1998–2003 (sections C and D), about changes of residence since 1986 (section H), about changes of marital status during respondent's life (section B) and 'history' of studies (section G).

The retrospective part on employment changes records information about the respondent's labor market status (employed, unemployed, or inactive) in December 1986, December 1991, December 1997 and the changes of the status in 1998–2003. The pattern of questioning continues until the reference week in 2003. Thereby the changes related to the labor market state (job changes, loss of job, finding a new job, starting and stopping jobseeking, *etc*.) divide the given period into 3 types of sub-periods:

- *periods of employment*, during which the respondent worked and received payment as a wage earner, entrepreneur, or a free-lancer; or worked without direct payment in a family enterprise or on his/her own farm;

[25] Discrete-time proportional hazard models with and without unobserved heterogeneity are estimated by ML methods using STATA command *pgmhaz* (program written by S. Jenkins).

[26] At the stage of fieldwork 4073 household questionnaires and 8663 individual questionnaires were collected. The average response rate among the households is 66%, while the average response rate within the households in the final data sample amounts to 87%.

- *periods of unemployment*, during which the respondent did not have a job, but was trying to find one and would have started a job immediately if possible;
- *periods of inactivity*, during which the respondent neither worked nor sought for a job.

Respondents are asked detailed questions relating to each labor market spell experienced, in particular, they are asked to recall the starting and ending dates of all labor market spells and reasons for transitions to other states; they are asked about various characteristics related to each job spell experienced, including the status of employment (employee; self-employed, entrepreneur or employer; unpaid family helper; and a member of a production cooperative/collective enterprise), occupation, wages, way of finding the job, on-job training and working part-time, and some employer's characteristics such as its legal form and full name, size, industry, location, type of ownership and its changes; for periods of non-employment they are asked about the reason for being non-employed (various categories of non-employed), the sources of subsistence, the periods of jobseeking (unemployment), the steps taken to find jobs and the reasons for stopping job search or not searching.

The employment history is considered to be recorded correctly in the questionnaire, if the respondent's economic status is known for December 1986, December 1991, December 1997 and the whole period of 1998–2003 is covered with periods of employment, unemployment, and inactivity, and there is no overlapping between the periods of employment, unemployment, and inactivity, since these periods are mutually exclusive. If the respondent's economic status has been changed in the middle of a month, it is specified which period covered the longer period of that month and, consequently, the month is considered either the last month of the preceding period or the first month of the following period.[27] Given that, the most natural unit of analysis of labor market spells is one month.

Thus, taking into account the above rule of no overlapping and no gaps between the different labor market spells and using the answers to the control questions (see sample of questions and brief description of variable design in Appendix A2 and A3), we have managed to compile complete labor market histories from December 1997 till the interview date for 8633 individuals. The choice of the year 1997 as the beginning year of the observation period for the analysis of unemployment spells may be attributed not only to the design of the questionnaire but also to the specific labor market environment in Ukraine after 1997 with rapidly growing unemployment and contracting employment after implementing a set of comprehensive reforms during 1994–1996 aimed at macroeconomic stabilization and effective restructuring, as was mentioned in the Introduction. Our study is, therefore, of direct policy relevance, given that the observation period

[27] In other words, the minimum length of the periods fixed in the ULMS is one month. If, for instance, there was a period of less than a month between leaving one job and starting a new one, this period is not reflected in the questionnaire as a separate period of unemployment. The only exclusion in this case is short unemployment spells that have started several days (less than a month) before the reference week.

covers the period before and after the 2001 reform of the unemployment benefit system into unemployment insurance system as well as the period before and after 2000 — the year of economic reversal in Ukraine.

Our sub-sample for the analysis of unemployment duration in Ukraine consists of individuals with at least one unemployment spell during the observation period who provided complete responses to the questions about the period of jobseeking.[28] Our dependent variable is the length of the unemployment spell defined as the number of months between the date of beginning of job search (month and year only) to the date of its end. To each unemployment spell experienced by a sample member we have attached a vector of the following demographic and other individual characteristics, the values for which are determined at the starting date of the unemployment spell to ensure their exogeneity:

- *Gender* (*Female* = 1). This variable may reflect diverse behavioral models of women as opposed to men because of their differing roles played in the family and society: usually women tend to remain unemployed longer than men. The gender seems to be important in determining probability of leaving unemployment although its effect in transition countries is not robust (*e.g.* Foley, 1997*a*; Nivorozhkina *et al.*, 2002, for Russia);
- *Marital Status* (*Married* = 1 if legally married or cohabiting, *Married* = 0 otherwise). The marital status of unemployed may affect the probability of exit from unemployment in the two opposite directions: on the one hand, single persons may have higher probability of exiting from unemployment because of their independence in making labor supply decisions and higher mobility, but on the other hand, married persons especially married men may exit to employment faster than single since they are responsible for maintaining sustainable family income;
- *Gender*Marital Status* (*Female*Married* = 1 if female married, *Female*Married* = 0 otherwise);
- *Number of children up to 15 years old* (integer number from 0 to 4) may affect job search behavior in the two opposite ways depending on the gender of unemployed and their labor supply incentives as in the case of marital status. From the point of view of income support, it is expected that more children would induce parents to work more and leave unemployment faster, but from the side of time, more small children may mean more time devoted to them and less to work, especially for women, and consequently, longer unemployment spells;

[28] All unemployment spells that started prior to December 1997 and have lasted to the interview date are discarded (133 cases), since the majority of these very long spells are experienced by disabled or pensioners and so can be redefined as spells of inactivity without significant losses for our analysis because of different behavioral model. See discussion of the definition of unemployment in the next section.

- *Gender*Number of children (Female*Number of children* — integer number from 0 to 4 for women, and 0 for men);
- *Age* (three dummy variables for the corresponding age group: from *25 to 39*, from *40 to 54*, and *older than 55*; reference age group is full 24 years and under) may be an important variable reflecting different labor market position of younger persons in contrast to older ones, since older unemployed individuals may have lower search intensity and lower attractiveness to an employer and so they have lower probability of re-employment or higher probability of leaving unemployment for economic inactivity than younger persons;
- *Education* (three dummy variables for the corresponding level of education: *general secondary or vocational* (diploma of high-school or PTU); *professional secondary or unfinished higher* (diploma of college or at least 3 years of study at the institute/university); *higher* (diploma of institute/university, any degree); reference education group is primary or unfinished secondary). The variable on the level of education may be partly capturing higher attractiveness of more educated persons to an employer and extended job opportunities implying higher probability of receiving a job offer;
- *Sources of subsistence* during an unemployment spell (*Unemployment benefits* = 1 if unemployment benefits or training allowance; *Casual work* = 1 if casual work or production and sale of products from own land plot or income from casual business activities or subsidiary farming for own needs; *Household income* = 1 if income of spouse or income of parents or support from relatives; *State transfers* = 1 if pension, stipend or study loan, child allowance, alimony, social benefits, subsistence allowance, or support by state or municipal institution (also, *Pension* = 1 if pension); and *Other sources of subsistence* = 1 if sale of property, income from rent, dividends, *etc*., loans or savings).[29] According to standard job search theory the *receipt of unemployment benefits* reduces job search activity and raises reservation wage, at the same time encouraging workers to remain in the labor force.[30] As discussed before, we expect that whether the unemployed person receives unemployment benefit or not does not play significant role in determining the probability of leaving unemployment. However, *other non-*

[29] We use dummy variables for various groups of sources of subsistence which reflect only presence or absence of particular type of income during the period of unemployment because it is impossible to estimate the amount of income, received by unemployed persons from various sources, using the ULMS data (see questionnaire in the Appendix A2). Hunt (1995) finds for Germany that dummy on receipt of UI is significant while the level of benefit receipt is insignificant. Addison and Portugal (2001) use dummy on access to unemployment benefits and find it highly significant in Portugal, but they group individuals by age (seven elements of age regressor) so that to "mimic the stepped increases in benefit entitlement with age". We think that dummy variable on receipt of unemployment benefits in our case is enough to capture the expected effect of UI on unemployment duration, given small variation in the level of unemployment benefit and duration of its payment among benefit recipients in Ukraine (see Appendix A1 and footnote 13).

[30] We include the receipt of stipend during training (40 cases) to the variable on receipt of unemployment benefits since according to the Law of Ukraine on Compulsory State Social Unemployment Insurance the level of unemployment benefit and stipend during training are calculated according to the same methodology, they are financed from the same source (Compulsory State Social Unemployment Insurance Fund) and are provided by the same organization (local offices of PES).

labor income or occasional unreported labor income during the period of unemployment is expected to lower the probability of exits to jobs for those having such non-labor income, and, perhaps, to increase the probability of exits to inactivity;[31]

- *Previous labor market state* (*Previously employed* = 1 if employed prior to the start of unemployment, *Previously employed* = 0 if previously inactive for more than 1 month). The probability of receiving a job offer or withdrawing from the labor force is likely to differ depending on whether an individual was economically inactive or employed before a spell of unemployment. Previously employed are expected to leave unemployment for job faster than their counterparts, but they may search longer before withdrawing from the labor force. Similarly, we control for the sector and occupation of previous employment and employment status of individuals entering unemployment after a period of employment;

- *Net wage in the last job before becoming unemployed* (ln(*real last wage*) — the logarithm of net last wages deflated by the national monthly CPI (January 1997 = 100)). This variable is one of the commonly used measures of expected income in work (Devine and Kiefer, 1991). High *previous net earnings* are expected to raise the probability of leaving unemployment to job, *ceteris paribus*, because the cost of unemployment in terms of lost wages is high and because high earnings may be correlated with a better wage offer distribution. But the last issue raises the question of potential endogeneity of previous earnings: the individuals who are more 'choosy' in job offers or who have more 'attractive' characteristics on the labor market, may have higher earnings. There is, therefore, a risk either of inadequate variation in this variable given the regressors included or that the estimated effect may in part pick up the effects of unobserved characteristics.

In addition to above individual characteristics, we use variables to account for *differences in local labor demand conditions*. Differentials in the local labor markets are proxied in our study by regional *unemployment rate* (accounting for between-oblast differences) and the *type of settlement* (accounting for within-oblast differences).[32] We expect that the average duration of unemployment increases as the unemployment stock increases, in other words unemployed persons in the oblasts with higher unemployment rate will have lower probability of exits from unemployment to job and longer spells of unemployment. Additionally, persons living in small towns or rural area with relatively low labor market activity and less diversified economy tend to be in unemployment longer than those living in large cities. We have matched in the registered unemployment rate (and

[31] The issue of inclusion of 'casual workers' to the sample of unemployed and endogeneity of engagement in casual activities is addressed in the next section

[32] The local unemployment rate is the most popular measure of the local labor demand conditions (*inter alia* Narendranathan and Stewart (1993) and Arulampalam and Stewart (1995) for the UK; Meyer (1990) for the US; Lubyova and van Ours (1997, 1999) for Slovakia, Foley (1997) for Russia). The alternative measures are local unemployment and vacancy rates for the individual's education group, real value of regional per capita industrial production, and regional agricultural/industrial employment ratio (Ham *et al*., 1998) or Herfindahl-Hirschman Index of employment concentration in the local labor market (Denisova, 2002). We will try to experiment with these alternative measures later.

other potential characteristics of the local labor market such as the stock of registered unemployed, stock of vacancies, and number of registered per vacancy in the end of the quarter) by the quarter of starting date of unemployment and by the region (24 oblasts, Kyiv City and Crimean Republic) where the person lived at the beginning of the corresponding unemployment spell.[33]

Finally, we add the *year* and the *quarter* of entering unemployment to control for changes in macroeconomic environment and possible seasonal effects. Since the Ukrainian economy exhibits significant growth starting from 2000, it is expected that the individuals who entered unemployment later during the observed period have significantly shorter unemployment spells than those who became unemployed earlier in the period.

Our final sample contains 2122 unemployment spells, experienced by 1799 individuals since December 1997 till the interview date in 2003: the average number of unemployment spells is 1.18 and there are 275 persons who experience more than one unemployment spell during the sample period (the maximum number of spells is 5). We distinguish the following three types of unemployment spells by destination states:

- *exit to employment* if the respondent has found a job (or started his business) after a period of job-seeking,
- *exit to inactivity* if the respondent has stopped job search, and
- *right-censored* if the period of job search was continuing at the date of an interview.

Table 6 provides some descriptive statistics for variables used in the unemployment duration analysis. It shows that one half of unemployment spells ends with a transition to employment, and censored spells account for the next largest proportion of unemployment spells (31%). The mean duration of both completed and uncompleted unemployment spells is about 17 months, with 46.5% of all spells lasting more than 12 months.[34] Distribution of unemployed persons with uncompleted spells by actual duration of their unemployment at the moment of interview shows that the share of long-term unemployed is 48% of all 'currently' unemployed according to the ULMS data.[35] This suggests that long-term unemployment remains an important issue in Ukraine even in stronger labor market conditions after economy's reversal and needs more careful investigation.

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[33] The information about characteristics of regional registered labor markets is taken from the Public Employment Center. We used information on registered unemployment rather than unemployment from the LFSs because of consistency in methodology and completeness of information at the quarterly basis by regions for the former indicator in the contrast to the latter. Furthermore, for comparison of the results we use the LFS yearly regional unemployment rate in one of our specifications (specification (4) in Tables 9*a* and 9*b*) instead of the quarterly registered unemployment rate.

[34] Due to limitation of the minimum length of the periods fixed in the ULMS to one month and retrospective nature of the ULMS, its sample tends to be biased towards long unemployment spells and this fact should be taken into account when analyzing duration of unemployment.

[35] For comparison, according the LFS data (2003:II) the share of unemployed with duration of non-employment of more than 12 months is 61% of all unemployed previously employed, and the share of unemployed with duration of job search of more than 12 months is 54% of all unemployed who were looking for work during the preceding four weeks.

Table 6. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Exit to employment	0.517	0.500	0	1
Exit to inactivity	0.173	0.379	0	1
Censored	0.308	0.462	0	1
Discrete duration	17.17	15.89	1	66
Duration group (total sample, N = 2122)				
<1 month	0.024	0.153	0	1
1–3 months	0.159	0.366	0	1
4–6 months	0.159	0.365	0	1
7–9 months	0.101	0.299	0	1
10–12 months	0.914	0.293	0	1
>12 months	0.465	0.499	0	1
Duration group (censored spells, N = 654)				
<1 month	0.041	0.199	0	1
1–3 months	0.136	0.343	0	1
4–6 months	0.156	0.363	0	1
7–9 months	0.098	0.293	0	1
10–12 months	0.087	0.287	0	1
>12 months	0.482	0.500	0	1
Female	0.508	0.500	0	1
Married [a]	0.555	0.497	0	1
Female*Married	0.292	0.455	0	1
Presence of children up to 15 years old	0.487	0.500	0	1
Number of children up to 15 years old	0.686	0.833	0	4
Female*Number of children up to 15 years old	0.384	0.711	0	4

Variable	Mean	Std. Dev.	Min	Max
Age group				
≤24	0.334	0.472	0	1
25–39	0.341	0.474	0	1
40–54	0.284	0.451	0	1
≥55	0.041	0.199	0	1
Age	32.971	12.206	15	67
Education				
Primary or unfinished secondary	0.140	0.347	0	1
General secondary or vocational	0.511	0.500	0	1
Professional secondary or unfinished higher	0.225	0.418	0	1
Higher	0.123	0.329	0	1
Sources of subsistence [b]				
Unemployment benefits or Stipend during training	0.180	0.384	0	1
Casual work	0.281	0.450	0	1
Income from casual work	0.165	0.371	0	1
Income from sale of products from own land plot	0.069	0.253	0	1
Income from casual business activities	0.028	0.166	0	1
Subsidiary farming for own needs	0.048	0.213	0	1
Household income	0.808	0.394	0	1
Income of spouse	0.371	0.483	0	1
Income of parents	0.401	0.490	0	1
Support from relatives	0.200	0.400	0	1
State transfers	0.201	0.401	0	1
Pension	0.092	0.289	0	1
Stipend or study loan	0.026	0.160	0	1
Other SS	0.061	0.239	0	1
Savings	0.050	0.219	0	1
Loans	0.009	0.942	0	1

Variable	Mean	Std. Dev.	Min	Max
Previous state				
Inactive	0.424	0.494	0	1
Employee	0.544	0.498	0	1
Self-employed, employer, or entrepreneur	0.023	0.149	0	1
Member of cooperative	0.010	0.099	0	1
Sector of previous employment (N = 1210)				
Agriculture	0.133	0.340	0	1
Manufacturing and mining	0.281	0.450	0	1
Electricity, gas and water supply	0.013	0.114	0	1
Construction	0.088	0.284	0	1
Trade, hotels and restaurants	0.183	0.387	0	1
Transport, storage and communication	0.065	0.247	0	1
Financial, real estate, renting and business activities	0.026	0.161	0	1
Public administration and defense	0.031	0.174	0	1
Education, health and social work	0.084	0.278	0	1
Other community, social and personal service activities	0.088	0.284	0	1
Other activities	0.006	0.076	0	1
Year of entering unemployment				
1997	0.161	0.368	0	1
1998	0.136	0.343	0	1
1999	0.130	0.336	0	1
2000	0.139	0.347	0	1
2001	0.131	0.338	0	1
2002	0.187	0.390	0	1
2003	0.115	0.319	0	1
Quarter of entering unemployment				
I	0.242	0.429	0	1
II	0.238	0.426	0	1
III	0.191	0.393	0	1
IV	0.329	0.470	0	1

Variable	Mean	Std. Dev.	Min	Max
Type of settlement				
Village or small town (less than 20 thds. inhabitants)	0.456	0.498	0	1
Town (from 20 to 500 thds.)	0.320	0.467	0	1
Large city (more than 500 thds.)	0.223	0.417	0	1
Local labor market characteristics [c]				
Regional registered unemployment rate	3.639	1.658	0.47	8.09
Number of registered unemployed per vacancy	20.825	24.859	0.53	324.55
Previous unemployment				
No previous unemployment	0.848	0.359	0	1
One prior unemployment spell	0.130	0.336	0	1
Two prior unemployment spells	0.018	0.133	0	1
Three and more prior unemployment spells	0.005	0.069	0	1

Note: N = 2122. Variables are measured at the beginning of the unemployment spell except for the local labor market characteristics which are measured at the end of the quarter corresponding to the starting date of the unemployment spell. a — Married refers to legally married or cohabiting (*i.e.* in non-registered marriage), while not married refers to single (never married), divorced, widowed or separated. b — All five variables on sources of subsistence are separate dummy variables since multiple responses were permitted, and they take the value of one if a respondent has chosen a corresponding alternative on sources of subsistence during a period of non-employment. For Casual work and Household income statistics is given also for all subcategories, while for State transfers and Other sources of subsistence it is provided only for two largest subcategories.

4.4. Methodological issues

Definition of unemployment. Before proceeding to the analysis, several important points should be noted. First, as discussed in Kapeluyshnikov and Vishnevskaya (2003) and Grogan and van den Berg (1999), there can be some difficulties connected with definition, measurement of unemployment and further comparison of unemployment measures from various sources. Although our study aims at examining the factors affecting duration of real unemployment rather than of officially registered unemployment, it should be stressed that definition of unemployment used in our study slightly differs from the ILO's standard definition (ILO, 1982) because of the peculiarity of applying retrospective data with a very long reference period from the ULMS.

Firstly, since labor market states are measured in relation to a long reference period such as several years rather than to a short period such as one week or one day, definition of the three labor market states employed in our study refers to the 'usually' employed, unemployed or economically inactive

as opposed to the 'currently' employed, unemployed or economically inactive individuals used in most studies.[36]

Secondly, according to the standard ILO unemployment criteria individuals who engage in casual work or casual business activities for wage, profit or family gain can not be classified as unemployed but only as employed. Furthermore, persons engaged in the production of economic goods and services for own or household consumption should be considered as in self-employment if such production comprises an important contribution to the total consumption of the household. In our study, however, we do not exclude individuals on the basis of their engagement in irregular businesses from the sample of unemployed if: 1) a person answered that he/she didn't have a job (including entrepreneurship, business activities, individual work, work in a family enterprise or on a farm, and freelance work) at some time period in the past; 2) a person gave the reason of not having a job and answered that he/she was seeking and available for work for any time during that period; 3) there is no overlapping in time between the period of employment and the period of non-employment according to respondent's answers (if there was such overlapping we reclassified a person as employed); and 4) a person pointed to income from casual work or business activities, production and sale of products from own land plot, or subsidiary farming for own needs as one of the sources of subsistence at that time of non-employment (see Appendix A3).[37] Unfortunately, the ULMS doesn't let to capture accurately the extent and the nature of such irregular, usually short-term, activities within a long period of non-employment. It is impossible to know for sure whether casual work or business activities in this case are really short-term and sporadic or they have systematic character; whether persons without formal job attachment have chosen these informal activities in view of formal sector opportunities, or they have been forced to engage in casual work activities or subsidiary farming just to survive but they would have preferred a regular job; whether engagement in such activities is a cause of lengthening of an unemployment spell, or long-term unemployment drives intensified search of any kind of economic activity including casual activities or subsidiary farming for own consumption. The last issue rises the problem of potential endogeneity of casual activities and subsidiary farming in our model.

Thirdly, we do not restrict our sample of unemployed individuals on the basis of methods of their job search (passive versus active) because most individuals in our sample have indicated a number of job search methods, both active and passive. The detailed analysis of 'activity' of job search is again complicated because of very long reference period.

And finally, we do not put any restrictions on the age of individuals in the sample as it is usually done using the retirement age as a threshold (Foley, 1997*a*; Grogan and van den Berg, 1999, among

[36] See ILO (1982) for discussion of differences between 'currently active population' and 'usually active population'.

[37] The first three criteria are used for the definition of unemployed individuals in our study. This definition is still highly disputable since it heavily depends on respondent's understanding of the concept of work and a job and its meaning for him, the importance of employment status in an individual's self-concept, his self-identification on the labor market, *etc*. (Morse and Weiss, 1955; Cohn, 1978).

others).[38] The reason for this is that we think that due to low retirement age (55 years old for women and 60 for men in general case) accompanied with very low pension (less than 30% of average wage) in Ukraine persons aged above retirement age have almost the same work incentives as those in pre-retirement age group.[39] Moreover, according to the ILO guidelines pensioners, students and others mainly engaged in non-economic activities during the reference period, who at the same time were in paid employment or self-employment above should be considered as employed on the same basis as other categories of employed persons, and persons who satisfy the basic criteria of unemployment should be classified as unemployed. We control for those who receive any kind of pension (not only for years of service or retirement age but also for disability and loss of provider) during a period of unemployment by including a separate dummy for such persons in one of our specifications.

Classification and recalled errors. One can argue that since sometimes it is difficult to distinguish between unemployed and economically inactive especially in retrospective data, it is better to aggregate the two states into a single non-employment state when analyzing exits from unemployment or inactivity to jobs. But as suggested by theoretical model of job search and empirical evidence (Flinn and Heckman, 1983), categories 'unemployed' and 'out of the labor force' are behaviorally distinct labor market states and it is not recommended to put them together. According to Poterba and Summers (1995) although some categories of individuals classified as 'out of the labor force' are conceptually distinct from 'unemployed' (*e.g.* disable or retired in the US), substantial portion of those reporting themselves as economically inactive may be reclassified as unemployed, and vice versa. Therefore, some allowance for spurious events that result from classification error should be made when analyzing unemployment duration and dynamics.

Finally, we might expect that the problem of classification error discussed by Poterba and Summers (1995) mainly in connection with panel data may aggravate as we go further back in time asking about unemployment periods. A large body of the literature which rely on psychological theory of memory, common sense and survey research has been developed to analyze reliability of recalled unemployment and recall errors in general (Sudman and Bradburn, 1973; Morgenstern and Burrett, 1974; Akerlof and Yellen, 1985; Levine, 1993; Dex and McCulloch, 1998; Paull, 2002, among many others). According to Morgenstern and Burrett (1974), Akerlof and Yellen (1985) and Levine (1993), unemployment rates calculated from the contemporaneous survey is likely to be higher than those computed from the retrospective survey, especially for individuals with "relatively weak labor market attachment" (*e.g.* women, youth, older people). Explaining these discrepancies they reckon upon two possible sources. The first is very natural and it consists in the possible differences in the

[38] Although the age limit following from the design of the ULMS is from 15 to 72, the largest age among unemployed in the sample is 67.

[39] Furthermore, there are many non-monetary reasons for continuing working. Morse and Weiss (1955) have found for men in the US that working serves not only a means function but also non-monetary functions and that because of them even in the age group of 55 years through 64 years almost two-thirds of the men in the sample would want to keep working even if they inherited enough money to live comfortably without working.

definition of unemployment because of different structure of the questionnaires. The second is also evident but more difficult to grasp because of the complexity of analysis of psychological features of memory: the differences in unemployment measures across various socio-demographic subgroups of individuals may result from the errors involved in recall of unemployment spells (in other words, recall bias), such as omission (or forgetting) of events (*i.e*. being unemployed), error in remembering the duration of job search, and telescoping (or compression of time when the unemployment spell is remembered as occurring more recently than it did) (see Akerlof and Yellen, 1985, for detail discussion). Additionally, studies of reliability of retrospective data and measurement error in general have shown that recall errors are related not only to the characteristics of the respondents but also to the characteristics of the interview and the data collection methods used in the surveys to improve memory (see Sudman and Bradburn, 1973). To sum up, the reliability of recall data is found to be lower the longer the recall period (fewer unemployment spells are likely to be reported as the recall period increases, shorter spells of unemployment are less likely to be recalled than longer spells over a course of time, the reported duration of unemployment may increase with recall period), the less salient and less unpleasant the unemployment is for the respondents (recall bias may vary by individual characteristics because of different degree of salience of unemployment for different individuals), and the less accurate is the design and methodology of the survey (Paull, 2002; Dex and McCulloch, 1998).

Our analysis based on the retrospective data over more than five years is certainly subject to reliability problems and recall bias. But we believe that relatively low labor market mobility of the majority of Ukrainian population due to fear of being unemployed[40], saliency and social undesirability of unemployment spell for most of individuals for the reasons of income loss, stigma (unemployed were considered parasites according to the communist ideology[41]) and loss of stability, and the careful design of the questionnaire (*e.g*. the use of diaries to reduce omissions, a lot of closed and open-ended questions, position of the retrospective part in the beginning of the questionnaire to minimize fatigue and to recover life history chronologically) minimize this problem. Furthermore, we try to overcome the problem of possible classification error (Poterba and Summers, 1995) using the ILO criteria for defining unemployed (didn't work, was looking for work and was available for work) rather than self-definition of the respondents as 'unemployed, looking for work'.[42]

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[40] It is argued in the literature that one of the main supply-side explanations of spreading hidden unemployment (in forms of unpaid leaves and shorter working weeks) and wage arrears in the FSU countries may be the fear of facing unemployment in declining economy after the decades of secured and compulsory employment under the Soviet Union (Gimpelson, 2001; Kapelyushnikov, 2001; Rutkowski, 1996)

[41] See discussion of unemployment in the Soviet Union in Gregory and Collier (1988). The authors have found positive albeit small (1.2 percent) unemployment rate in the USSR for the 1970s in contrast to the zero percent unemployment rate officially claimed by the Soviet government.

[42] The problem of classification error may be still in place, however, since as Paull (2002) suggests time in unemployment is less likely to be recalled correctly than periods of employment and inactivity, and so the spell of unemployment may be reclassified as the spell of inactivity rather than forgotten at all.

5. ESTIMATION RESULTS

5.1. Univariate non-parametric duration analysis

Figs 1–4 plot the empirical survivor and hazard functions for unemployment duration in months, estimated using the Kaplan–Meier product limit estimator, for total sample and by destination states. The survivor function shows the proportion of unemployment spells surviving for a given period in time, while the hazard function plots the probability of leaving unemployment in a given time interval conditional on having survived up to that point. Additionally, Table 7 presents estimated survivor function by destination state of exits from unemployment for selected time periods. Only 1% of unemployment spells in our sample last one month or less what can be explained by the design of the survey with the minimum length of periods fixed of one month. 13% of spells last under 3 months, 26% less than half a year, and 42% less than a year. The striking message of the Table 7 is that 25% of unemployment spells last more than 3 years and 6% last more than 5 years that can be partly explained by overreporting the unemployment durations because of recall errors (see discussion in the previous subsection). If we concentrate on spells decomposed by destination state we can observe even longer durations and larger proportions of unemployment spells surviving at each period of time, especially for spells terminating with inactivity (Figs 3–4).

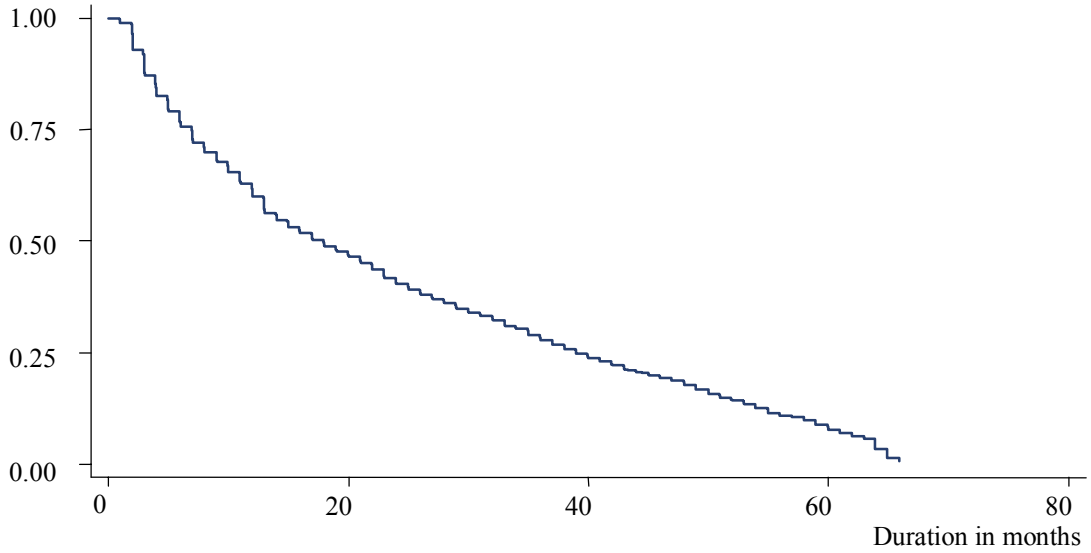

Fig. 1. Empirical Survivor function — all exits from unemployment

The survival function (Fig. 1) is rather smooth without springs, while the hazard function (Fig. 2) initially rises until about 12 months, after slight decline it remains relatively stable and then it sharply increases for the duration period after 4 years with its peak at 64 months. If the initial period of positive duration dependence may be explained by more intensive job search during the first year of unemployment spell and then by discouragement after a year of unsuccessful job seeking, the second increase of the hazard may be attributed to relatively few observations with durations beyond four years and may be considered spurious.[43] Nevertheless, the shape of the estimated

[43] The second increase of the hazard function may be attributed to the fact that some respondents with very long spells of unemployment feel stigmatized and lie about their exit from unemployment to employment or inactivity. We have examined such persons which exited from unemployment in 2003, and it seems that this explanation is not the case.

hazard during the first four years may give us a rough guide to the true trajectory of duration dependence amongst unemployed in Ukraine.

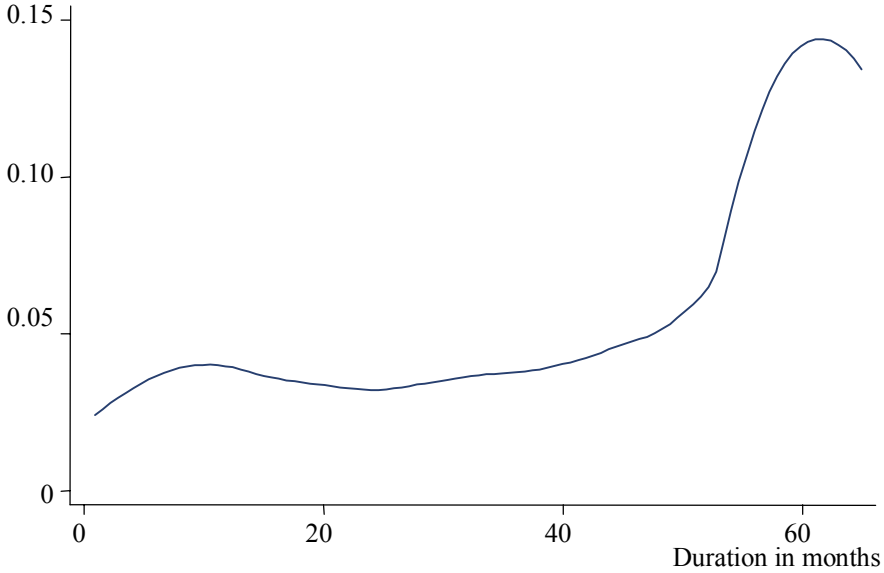

Fig. 2. Empirical Hazard function — all exits from unemployment

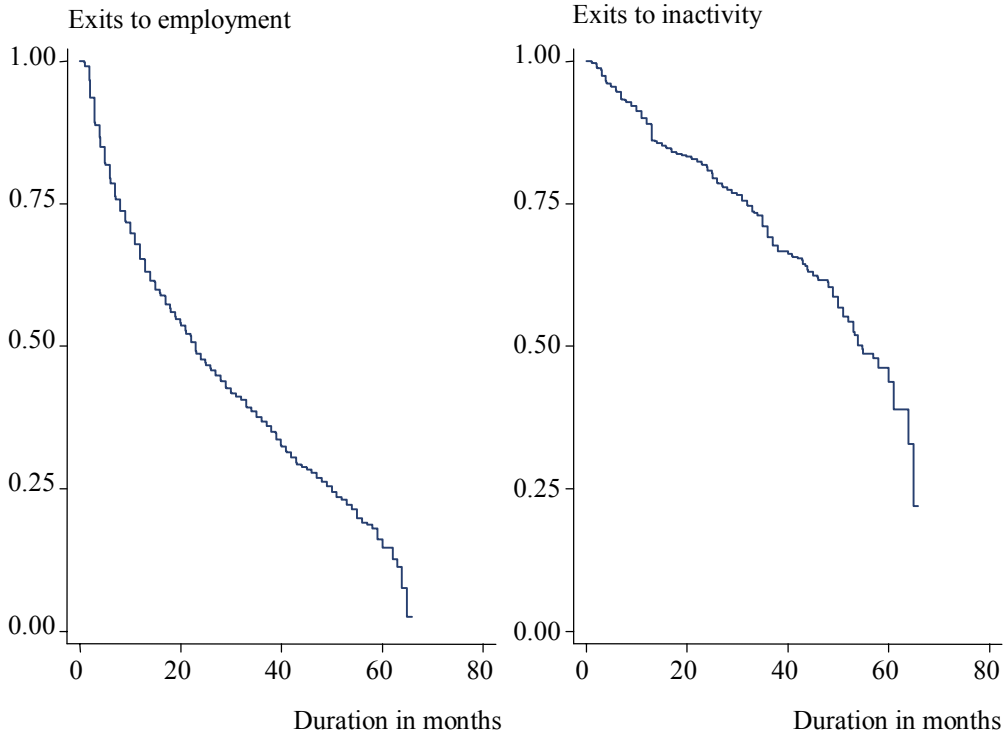

Fig. 3. Empirical Survivor functions — exits from unemployment by destination state

We also assess non-parametrically the importance of various individual characteristics to duration comparing stratified Kaplan–Meier survivor functions (Figs 5–6 for unemployment benefits and casual work) and testing their equality (Table 8).[44]

[44] We report only selected results in this paper. The survival and hazard function graphs drawn for each characteristic used in the analysis can be obtained on request from the author.

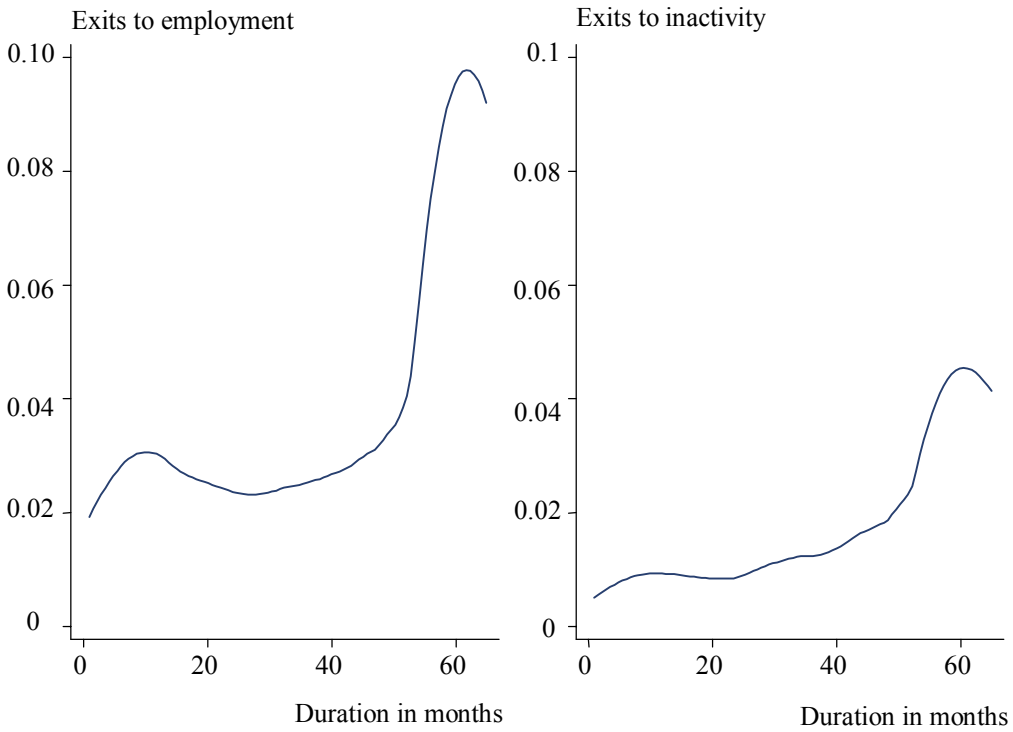

Fig. 4. Empirical Hazard functions — exits from unemployment by destination state

Table 7. Estimated Kaplan–Meier survivor function

Duration (months)	Exit from unemployment	Exit from unemployment to employment	Exit from unemployment to inactivity
1	0.99	0.99	1.00
2	0.93	0.94	0.99
3	0.87	0.89	0.98
4	0.82	0.85	0.96
5	0.78	0.82	0.96
6	0.74	0.79	0.95
9	0.66	0.72	0.92
12	0.58	0.65	0.89
15	0.51	0.60	0.85
18	0.47	0.56	0.84
21	0.43	0.52	0.83
24	0.38	0.48	0.81
30	0.32	0.42	0.76
36	0.25	0.37	0.69
42	0.20	0.30	0.65
48	0.16	0.26	0.60
54	0.10	0.21	0.50
60	0.06	0.15	0.44

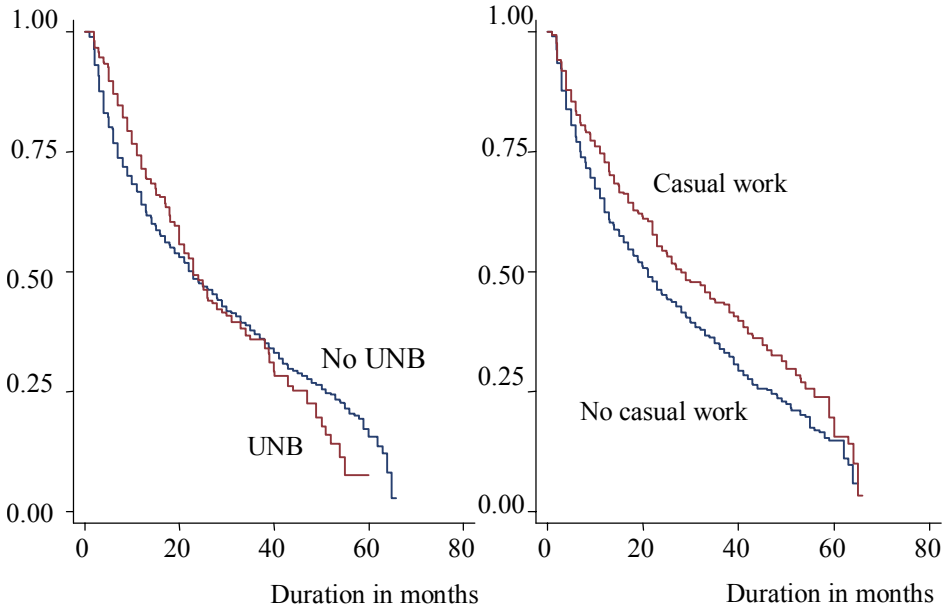

Fig. 5. Empirical Survivor functions — exits from unemployment to employment, stratified by Unemployment benefits and Casual work

The effect of gender on unemployment duration seems to be not important when analyzing all unemployment spells, but it appears to be significant when we distinguish between exits to employment and exits to inactivity. Women experience longer unemployment spells when exiting to employment and shorter when withdrawing from the labor force. During the first year 31% of women and 37% of men have exited to employment that means that women are more exposed to long-term unemployment.

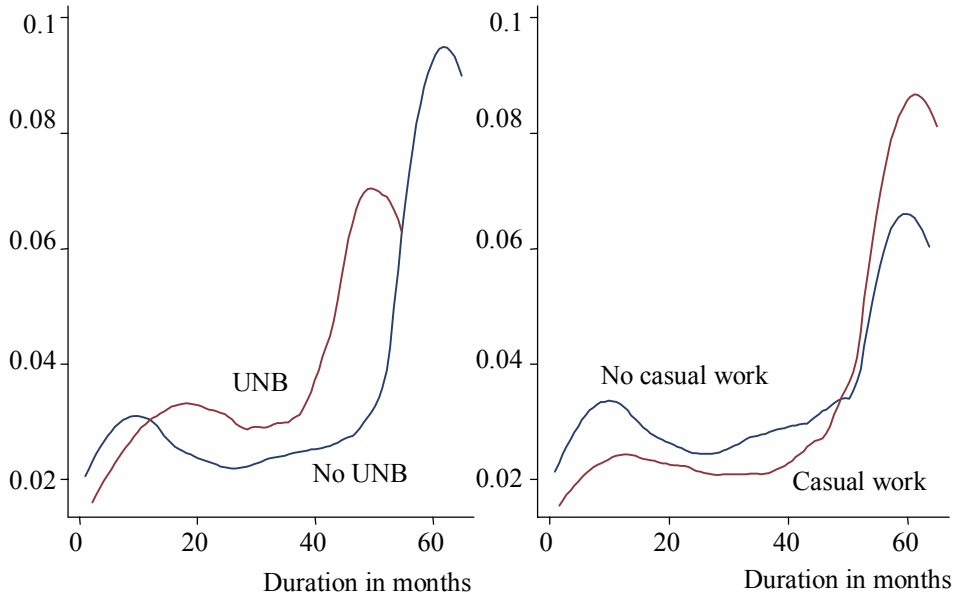

Fig. 6. Empirical Hazard functions — exits from unemployment to employment, stratified by Unemployment benefits and Casual work

Table 8. Log-rank test for equality of survivor functions across selected subgroups ($Pr>\chi^2$)

Subgroups	Exit from unemployment	Exit from unemployment to employment	Exit from unemployment to inactivity
Male/Female	0.5110	0.0163	0.0047
Age groups	0.0000	0.0000	0.0000
Education groups	0.0309	0.0049	0.3720
Married/Not married	0.0067	0.0025	0.8663
Married female/Other	0.0122	0.0002	0.1481
Children up to 15 years/No children	0.0008	0.6744	0.0000
Female with children up to 15 years/Other	0.4483	0.5619	0.6065
UB recipient/Not UB recipient	0.6717	0.3442	0.4189
Casual work/No casual work	0.0005	0.0001	0.8687
Household income/No household income	0.2110	0.2976	0.4914
State transfers/No state transfers	0.1867	0.0002	0.0002
Other sources of subsist./No other SS	0.0124	0.0007	0.3879
Type of settlement groups	0.0000	0.0000	0.0135
Number of previous unemployment spells groups	0.0007	0.0248	0.0189
Previously employed/Previously inactive	0.0001	0.0050	0.0025

Duration of unemployment strongly depends on the age group and it increases with age when analyzing spells ending with employment and decreases for spells terminating with inactivity. The mean duration of unemployment (ending in employment) for persons aged above 55 is almost twice higher than for the persons from the youngest age group.

Analysis of marital status, presence of small children (younger than 15 years) and interacted terms for married women and women with children indicates that married persons experience longer unemployment durations (may be due to the contribution of married women) and that presence of children for women doesn't seem to make significant differences in distribution of unemployment duration. As predicted by the job search theory, duration of unemployment decreases with the level of education and with the size of the settlement.

Finally, as we expected there is no effect of receipt of unemployment benefits but the effect of having income from casual work, business activity or subsidiary agricultural production or from various kinds of state transfers is very strong and consistent with search theory: individuals with such an income have longer durations and are more prone to long-term unemployment.

5.2. Multivariate semiparametric duration analysis

To assess the joint effect of various individual and labor market characteristics affecting the probability of exit from unemployment we employ three specifications in a competing-risk

framework distinguishing between exits to employment and exits to economic inactivity: two discrete-time complementary log-log models, one with fully flexible non-parametric baseline hazard like in Meyer (1990) and the other with a polynomial baseline hazard, and a continuous-time Cox proportional hazard model (Tables 9*a* and 9*b*).[45] At the first stage of our empirical work we tried also parametric models with Weibull, log-normal and log-logistic specifications of the baseline hazard comparing to the Cox specification but assessment of the overall model fit based on the analysis of Cox–Snell residuals has shown that Cox proportional hazard model fits the data better than parametric ones. We also estimated the models allowing for unobserved heterogeneity (gamma distributed) but the variance of the heterogeneity is not significantly different from zero as for exits to employment as for exits to inactivity implying that no unobserved heterogeneity is found in our case.[46]

Table 9*a*. Duration analysis of exits from unemployment in Ukraine — exits to employment, all unemployment spells

Variable	Cox PH		Cloglog with cubic polynomial baseline		Cloglog with nonparametric baseline	
	(1)		(2)		(3) #	
Female	–0.084	(0.095)	–0.080	(0.096)	–0.087	(0.096)
Married	0.295**	(0.104)	0.304**	(0.104)	0.297**	(0.104)
Female*Married	–0.294*	(0.134)	–0.301*	(0.134)	–0.292*	(0.134)
Number of children	–0.079	(0.066)	–0.079	(0.066)	–0.078	(0.066)
Female*Children	0.109	(0.084)	0.107	(0.084)	0.107	(0.084)
Age [a]						
25–39	–0.413**	(0.089)	–0.417**	(0.089)	–0.419**	(0.089)
40–54	–0.617**	(0.097)	–0.626**	(0.097)	–0.627**	(0.097)
≥55	–1.116**	(0.213)	–1.126**	(0.215)	–1.123**	(0.215)

[45] We have examined also the effect of religion, nationality, health status, the number of dependants younger than 15 or older than 75 in the household, previous employment status, sector of previous employment (according to the NACE classification), last occupation before unemployment spell (according to the ISCO classification), and national unemployment rate (controlling for macroeconomic climate) but these factors appear to be not significant, and our main results are robust to the inclusion of these additional variables.

[46] No significant frailty effect has been also found in Stetsenko (2003) for Ukraine and Grogan and van den Berg (1999) and Foley (1997, for exits to employment) for Russia. Furthermore, Narendranathan and Stewart (1993), argue that "there is no reason for any resulting distortions connected with possible misspecifications through unobserved heterogeneity to be less serious than those caused by ignoring unobserved heterogeneity". Given these findings, we present final estimation results without accounting for unobserved heterogeneity.

Variable	Cox PH		Cloglog with cubic polynomial baseline		Cloglog with nonparametric baseline	
	(1)		(2)		(3) #	
Education [b]						
General secondary or vocational	0.057	(0.094)	0.047	(0.093)	0.047	(0.094)
Professional secondary or unfinished higher	0.142	(0.107)	0.136	(0.107)	0.139	(0.107)
Higher	0.379**	(0.123)	0.372**	(0.123)	0.375**	(0.124)
Sources of subsistence						
Unemployment benefits	0.030	(0.079)	0.031	(0.080)	0.029	(0.080)
Casual work	–0.276**	(0.075)	–0.265**	(0.075)	–0.269**	(0.075)
Household income	–0.250**	(0.090)	–0.244**	(0.090)	–0.249**	(0.091)
State transfers	–0.280**	(0.087)	–0.279**	(0.088)	–0.276**	(0.088)
Other SS	0.336**	(0.144)	0.317*	(0.145)	0.329*	(0.145)
Regional UR [c]	–0.073**	(0.023)	–0.072**	(0.023)	–0.073**	(0.023)
Type of settlement [d]						
Town	0.083	(0.072)	0.087	(0.073)	0.086	(0.073)
Large city	0.262**	(0.091)	0.269**	(0.091)	0.267**	(0.091)
Previous unemployment [e]						
1 prior spell	0.105	(0.106)	0.114	(0.107)	0.110	(0.107)
2 prior spells	–0.099	(0.341)	–0.124	(0.344)	–0.127	(0.343)
3 or more prior spells	0.614	(0.346)	0.615	(0.350)	0.618	(0.367)
Previously employed [f]	–0.096	(0.082)	–0.108	(0.082)	–0.103	(0.082)
Year						
1998	–0.066	(0.129)	–0.090	(0.129)	–0.100	(0.129)
1999	0.124	(0.133)	0.123	(0.134)	0.102	(0.134)
2000	0.195	(0.133)	0.169	(0.133)	0.165	(0.133)
2001	0.241	(0.142)	0.203	(0.143)	0.198	(0.143)
2002	0.388**	(0.148)	0.328*	(0.150)	0.298*	(0.149)
2003	0.454	(0.259)	0.034	(0.251)	0.038	(0.255)

Variable	Cox PH		Cloglog with cubic polynomial baseline		Cloglog with nonparametric baseline	
	(1)		(2)		(3) #	
Quarter						
II	–0.105	(0.107)	–0.132	(0.107)	–0.114	(0.107)
III	–0.057	(0.100)	–0.069	(0.100)	–0.058	(0.100)
IV	0.090	(0.106)	0.080	(0.106)	0.079	(0.107)
Duration	–		–0.004	(0.014)	–	
Duration^2	–		–0.001	(0.001)	–	
Duration^3	–		0.000**	(0.000)	–	
Constant	–		–2.698**	(0.220)	–	
N	2122 spells		36429 spell-months		36397 spell-months	
Log-likelihood	–7347.208		–4809.117		–4736.961	

Variable	Cloglog with nonparametric baseline					
	(4)		(5)		(6)	
Female	–0.100	(0.097)	0.063	(0.167)	–0.081	(0.096)
Married	0.290**	(0.105)	0.215	(0.162)	0.304**	(0.104)
Female*Married	–0.295*	(0.135)	–0.469*	(0.212)	–0.300*	(0.134)
Number of children	–0.096	(0.067)	–0.032	(0.109)	–0.081	(0.066)
Female*Children	0.130	(0.085)	0.116	(0.134)	0.091	(0.085)
Age [a]						
25–39	–0.399**	(0.089)	–0.445**	(0.141)	–0.400**	(0.090)
40–54	–0.610**	(0.098)	–0.682**	(0.145)	–0.586**	(0.099)
≥55	–1.094**	(0.213)	–0.982**	(0.313)	–0.952**	(0.225)
Education [b]						
General secondary or vocational	0.030	(0.094)	–0.080	(0.154)	0.060	(0.093)
Professional secondary or unfinished higher	0.131	(0.107)	0.127	(0.165)	0.153	(0.107)
Higher	0.373**	(0.124)	0.421**	(0.181)	0.376**	(0.123)

Variable	Cloglog with nonparametric baseline					
	(4)		(5)		(6)	
Sources of subsistence						
Unemployment benefits	0.013	(0.080)	–0.091	(0.115)	0.017	(0.080)
Casual work	–0.266**	(0.075)	–0.196	(0.112)	–0.292**	(0.076)
Household income	–0.247**	(0.091)	–0.320*	(0.128)	–0.294**	(0.091)
State transfers	–0.287**	(0.087)	–0.454**	(0.141)		
Pension	–		–		–0.553**	(0.140)
Other state transfers	–		–		–0.105	(0.104)
Other SS	0.337*	(0.144)	0.288	(0.196)	0.315*	(0.145)
Regional UR [c]	–0.036**	(0.014)	–0.083*	(0.037)	–0.077**	(0.023)
Type of settlement [d]						
Town	0.083	(0.074)	0.163	(0.117)	0.094	(0.073)
Large city	0.360**	(0.084)	0.400**	(0.144)	0.269**	(0.091)
Previous unemployment [e]						
1 prior spell	0.122	(0.107)	–0.026	(0.136)	0.123	(0.108)
2 prior spells	–0.105	(0.339)	–0.543	(0.482)	–0.102	(0.346)
3 or more prior spells	0.582	(0.367)	0.612**	(0.193)	0.610	(0.345)
Previously employed [f]	–0.098	(0.082)	–0.099	(0.207)	–0.108	(0.083)
Ln(real last wage) [g]	–		–0.027	(0.070)	–	
N	36397 spell-months		17611 spell-months		36397 spell-months	
Log-likelihood	–4738.794		–2138.306		–4733.626	

Note: Number of failures is 1099. Figures reported are the estimated coefficients. Robust standard errors adjusted for clustering on individual identifier in parentheses. ** and * — denote significance at the 1% and 5% levels, respectively. [#] — Baseline hazard parameters are reported in Table 9*d*. Variables are dummy variables except for regional unemployment rate, number of children, female*children, and wages. All models include year and quarter dummies. a — Aged under 24 is the base category. b — Primary or unfinished secondary education is the base category. c — Registered unemployment rate for 24 oblasts, Crimean Republic and Kiev City in specifications (1)–(3), (5)–(6) and ILO-type unemployment rate in specification (4). d — Village or small town is the base category. e — No previous unemployment is the base category. f — Previously inactive is the base category. g — Wages are deflated by national monthly CPI, Jan. 1997 = 100. Exits to inactivity are considered censored when estimating exits to employment, and vice versa.

Table 9*b*. Duration analysis of exits from unemployment in Ukraine — exits to inactivity, all unemployment spells

Variable	Cox PH		Cloglog with cubic polynomial baseline		Cloglog with nonparametric baseline	
	(1)		(2)		(3) #	
Female	0.138	(0.179)	0.158	(0.181)	0.151	(0.182)
Married	–0.023	(0.194)	0.008	(0.197)	0.001	(0.196)
Female*Married	0.037	(0.238)	0.016	(0.241)	0.024	(0.241)
Number of children	–0.275	(0.145)	–0.274	(0.146)	–0.274	(0.146)
Female*Children	0.213	(0.167)	0.217	(0.169)	0.217	(0.168)
Age [a]						
25–39	–0.057	(0.173)	–0.068	(0.173)	–0.071	(0.173)
40–54	0.505**	(0.165)	0.486**	(0.166)	0.491**	(0.167)
≥55	1.137**	(0.236)	1.141**	(0.237)	1.137**	(0.237)
Education [b]						
General secondary or vocational	0.056	(0.155)	0.040	(0.157)	0.046	(0.157)
Professional secondary or unfinished higher	0.154	(0.166)	0.128	(0.168)	0.146	(0.168)
Higher	0.023	(0.211)	–0.003	(0.212)	0.009	(0.212)
Sources of Subsistence						
Unemployment benefits	0.124	(0.142)	0.147	(0.144)	0.131	(0.144)
Casual work	0.149	(0.122)	0.159	(0.122)	0.156	(0.123)
Household income	0.359*	(0.149)	0.365*	(0.151)	0.360*	(0.152)
State transfers	0.194	(0.135)	0.215	(0.136)	0.209	(0.137)
Other SS	–0.174	(0.292)	–0.184	(0.294)	–0.182	(0.292)
Regional UR [c]	–0.055	(0.037)	–0.051	(0.037)	–0.054	(0.037)
Type of settlement [d]						
Town	–0.347**	(0.131)	–0.352**	(0.132)	–0.345**	(0.132)
Large city	–0.255	(0.172)	–0.254	(0.172)	–0.256	(0.173)
Previous unemployment [e]						
1 prior spell	0.067	(0.197)	0.086	(0.199)	0.081	(0.200)
2 prior spells	0.383	(0.515)	0.329	(0.510)	0.312	(0.521)
3 or more prior spells	1.018	(0.799)	0.917	(0.839)	0.996	(0.844)
Previously employed [f]	–0.589**	(0.134)	–0.597**	(0.136)	–0.597**	(0.137)

Variable	Cox PH		Cloglog with cubic polynomial baseline		Cloglog with nonparametric baseline	
	(1)		(2)		(3) #	
Year						
1998	0.530*	(0.234)	0.515*	(0.236)	0.501*	(0.236)
1999	0.848**	(0.260)	0.831**	(0.262)	0.812**	(0.262)
2000	1.087**	(0.257)	1.026**	(0.257)	1.029**	(0.257)
2001	1.315**	(0.293)	1.216**	(0.293)	1.240**	(0.291)
2002	2.076**	(0.320)	2.017**	(0.313)	1.920**	(0.313)
2003	3.674**	(0.417)	2.970**	(0.392)	3.120**	(0.399)
Quarter						
II	0.421*	(0.169)	0.295	(0.160)	0.348*	(0.165)
III	0.277	(0.181)	0.165	(0.175)	0.236	(0.178)
IV	0.398*	(0.193)	0.309	(0.187)	0.343	(0.190)
Duration	–		0.104**	(0.028)	–	
Duration^2	–		–0.003**	(0.001)	–	
Duration^3	–		0.000**	(0.000)	–	
Constant	–		–6.675**	(0.444)	–	
N	2122 spells		36429 spell-months		35838 spell-months	
Log-likelihood	–2289.269		–1940.454		–1869.557	

Variable	Cloglog with nonparametric baseline			
	(4)		(5)	
Female	0.146	(0.182)	0.141	(0.181)
Married	0.004	(0.196)	–0.005	0.196)
Female*Married	0.016	(0.241)	0.029	(0.241)
Number of children	–0.287	(0.145)	–0.275	(0.146)
Female*Children	0.236	(0.167)	0.237	(0.169)
Age [a]				
25–39	–0.063	(0.173)	–0.086	(0.174)
40–54	0.503**	(0.167)	0.459**	(0.169)
≥55	1.160**	(0.237)	1.040**	(0.254)

Variable	Cloglog with nonparametric baseline			
	(4)		(5)	
Education [b]				
General secondary or vocational	0.034	(0.156)	0.043	(0.158)
Professional secondary or unfinished higher	0.141	(0.167)	0.135	(0.170)
Higher	0.017	(0.212)	0.012	(0.213)
Sources of Subsistence				
Unemployment benefits	0.111	(0.143)	0.137	(0.144)
Casual work	0.156	(0.124)	0.166	(0.123)
Household income	0.366*	(0.151)	0.395*	(0.155)
State transfers	0.198	(0.135)	–	
Pension	–		0.342*	(0.173)
Other state transfers	–		0.060	(0.171)
Other SS	–0.181	(0.290)	–0.172	(0.292)
Regional UR [c]	–0.018	(0.023)	–0.050	(0.037)
Type of settlement [d]				
Town	–0.339*	(0.134)	–0.351**	(0.133)
Large city	–0.179	(0.158)	–0.256	(0.174)
Previous unemployment [e]				
1 prior spell	0.092	(0.200)	0.070	(0.201)
2 prior spells	0.323	(0.518)	0.284	(0.521)
3 or more prior spells	0.964	(0.846)	0.989	(0.845)
Previously employed [f]	–0.592**	(0.136)	–0.587**	(0.137)
N	35838 spell-months		35838 spell-months	
Log-likelihood	–1870.263		–1868.983	

Note: Number of failures is 369. Figures reported are the estimated coefficients. Robust standard errors adjusted for clustering on individual identifier in parentheses. ** and * — denote significance at the 1% and 5% levels, respectively. [#] — Baseline hazard parameters are reported in Table 9*d*. Variables are dummy variables except for regional unemployment rate, number of children, and female*children. All models include year and quarter dummies. a — Aged under 24 is the base category. b — Primary or unfinished secondary education is the base category. c — Registered unemployment rate for 24 oblasts, Crimean Republic and Kiev City in specifications (1)–(3), (5)–(6) and ILO-type unemployment rate in specification (4). d — Village or small town is the base category. e — No previous unemployment is the base category. f — Previously inactive is the base category. Exits to inactivity are considered censored when estimating exits to employment, and vice versa.

To account for the possible correlation between spells experienced by one person (serial correlation) for the individuals with multiple spells of unemployment we include variable on the number of previous unemployment spell to the estimation model and also fit all our models with the standard errors adjusted for clustering on the individual identification. Furthermore, we estimated also the models using subsample consisting of individuals who experienced only one unemployment spell during the observation period but the results have not changed significantly (Table 9*c*). Thus, we can suggest that serial correlation might not be a problem in our case and the behavioral model for the persons with several unemployment spells doesn't differ significantly from those without previous unemployment experience.

Table 9*c*. Duration analysis of exits from unemployment in Ukraine — exits to employment, only individuals with single unemployment spell

Variable	Cox PH		Cloglog with cubic polynomial baseline		Cloglog with nonparametric baseline	
	(1)		(2)		(3) #	
Female	–0.043	(0.117)	–0.036	(0.119)	–0.045	(0.119)
Married	0.473**	(0.132)	0.480**	(0.131)	0.473**	(0.132)
Female*Married	–0.381*	(0.161)	–0.393*	(0.161)	–0.379*	(0.161)
Number of children	–0.145	(0.081)	–0.144	(0.081)	–0.144	(0.081)
Female*Children	0.186	(0.099)	0.186	(0.100)	0.186	(0.099)
Age [a]						
25–39	–0.513**	(0.111)	–0.517**	(0.110)	–0.522**	(0.110)
40–54	–0.711**	(0.122)	–0.720**	(0.122)	–0.723**	(0.122)
≥55	–1.103**	(0.243)	–1.112**	(0.244)	–1.109**	(0.244)
Education [b]						
General secondary or vocational	0.073	(0.117)	0.063	(0.116)	0.064	(0.116)
Professional secondary or unfinished higher	0.217	(0.129)	0.210	(0.129)	0.213	(0.129)
Higher	0.446**	(0.147)	0.440**	(0.146)	0.441**	(0.147)

Variable	Cox PH		Cloglog with cubic polynomial baseline		Cloglog with nonparametric baseline	
	(1)		(2)		(3) #	
Sources of subsistence						
Unemployment benefits	0.018	(0.100)	0.018	(0.101)	0.016	(0.101)
Casual work	–0.271**	(0.092)	–0.253**	(0.092)	–0.260**	(0.092)
Household income	–0.277*	(0.111)	–0.264*	(0.111)	–0.270*	(0.113)
State transfers	–0.294**	(0.102)	–0.291**	(0.103)	–0.289**	(0.103)
Other SS	0.300	(0.171)	0.276	(0.173)	0.287	(0.172)
Regional UR [c]	–0.071**	(0.027)	–0.069*	(0.027)	–0.070**	(0.027)
Type of settlement [d]						
Town	0.063	(0.088)	0.068	(0.089)	0.067	(0.089)
Large city	0.294**	(0.109)	0.300**	(0.109)	0.298**	(0.109)
Previously employed [f]	–0.092	(0.101)	–0.100	(0.102)	–0.096	(0.102)
Year						
1998	–0.220	(0.160)	–0.257	(0.160)	–0.265	(0.160)
1999	–0.019	(0.166)	–0.030	(0.166)	–0.048	(0.167)
2000	0.119	(0.161)	0.087	(0.162)	0.081	(0.162)
2001	0.151	(0.174)	0.099	(0.176)	0.103	(0.176)
2002	0.415*	(0.175)	0.350	(0.176)	0.322	(0.175)
2003	0.540	(0.310)	0.107	(0.301)	0.103	(0.305)
Quarter						
II	–0.079	(0.128)	–0.109	(0.127)	–0.085	(0.128)
III	–0.089	(0.127)	–0.105	(0.127)	–0.090	(0.127)
IV	0.111	(0.133)	0.094	(0.133)	0.101	(0.133)
Duration	–		–0.012	(0.017)	–	
Duration^2	–		–0.001	(0.001)	–	
Duration^3	–		0.000*	(0.000)	–	
Constant	–		–2.740**	(0.267)	–	
N	1524 spells		29196 spell-months		29164 spell-months	
Log-likelihood	–4770.494		–3381.103		–3332.625	

Note: Number of failures is 749. Figures reported are the estimated coefficients. Robust standard errors adjusted for clustering on individual identifier in parentheses. ** and * — denote significance at the 1% and 5% levels, respectively. # — Baseline hazard parameters are reported in Table 9*d*. Variables are dummy variables except for regional unemployment rate, number of children, and female*children. All models include year and quarter dummies. a — Aged under 24 is the base category. b — Primary or unfinished secondary education is the base category. c — Registered unemployment rate for 24 oblasts, Crimean Republic and Kiev City. d — Village or small town is the base category. f — Previously inactive is the base category. Exits to inactivity are considered censored when estimating exits to employment, and vice versa.

Table 9*a* presents estimation results for the determinants of unemployment duration before re-employment. The first three models use the same explanatory variables, but different specifications for the baseline hazard. The significance, signs and magnitudes of the estimated coefficients in models (1)–(3) are almost identical, so we base our interpretations on the estimates of the model with nonparametric baseline hazard (3).[47] Model (4) is the same as model (3) with the only difference that it uses yearly regional unemployment rates according to the LFS instead of regional registered unemployment rate incorporated in the other models. In model (5) we include the log of previous earnings with the same specification of the baseline hazard as in models (3) or (4). Finally, model (6) differs from the basic model (3) in that those who receive pension are separated from those who receive other kinds of state transfers. All models include yearly and quarterly dummies in order to control for macroeconomic environment and seasonal effects.

The results suggest that differences in hazards of exit to employment between men and women do not appear to be significant. Married women tend to have lower hazard rates from unemployment to employment although married individuals as a whole are more likely to leave unemployment to employment. This suggests that historically established pattern of family responsibilities in Ukraine is an important factor in the labor supply decisions. At the same time, the number of small children has no effect on the duration of unemployment. This finding may be partly attributed to the well functioning system of pre-school and out-of-school education developed under the Soviet Union with the aim of promoting women's labor force participation.

The age coefficients suggest that the probability of exit from unemployment to employment decreases with age and that older worker are at a disadvantage in a rapidly changing economic environment. The estimates in model (3) imply that at each survival time the hazard rate is approximately halved for persons aged between 40 and 54, and the hazard rate for those who are 55 or older is about one third of the hazard rate for those who are 24 or younger. These results are consistent with job search theory and empirical evidence for many transition countries (*e.g.* Foley, 1997*a*; Nivorozhkina, 2002; Stetsenko, 2003) but they contrast to the findings of many studies for the early period of transition about longer duration of unemployment among young persons (*e.g.* Earle and Pauna, 1996).

As in the non-parametric analysis, the exit rate to employment increases with education, although only the coefficient on higher education is statistically significant: persons with completed higher education have the hazard rate of exit to employment which is 45% higher than the hazard rate for the individuals with primary or unfinished secondary education, *ceteris paribus*. This finding is in the conflict with the effect of education on exits from registered unemployment in Ukraine found by Stetsenko (2003). We attribute this discrepancy to the difference in the composition of vacancies

[47] Interpretation of the estimated coefficients in terms of the effect of changes in one of explanatory variables, other things are held constant, on expected duration is complicated in the discrete-time models with nonparametric baseline. Therefore, we offer interpretation of coefficients according to the formulas (2) and (3).

notified at the public employment service and those advertised in the newspapers and private employment agencies in Ukraine with the former heavily represented by vacations for less-educated and less skilled persons (see Kuzmin *et al.*, 2003, for details).

Our results support our hypothesis of no significant effect of receiving unemployment benefits implying that the existing unemployment benefit system is not contributing to longer unemployment spells. However, existence of other sources of subsistence during a period of unemployment such as income from casual work activities and subsidiary farming or household income or state transfers significantly lowers the probability of re-employment almost by the same amount. This shows that such individuals are likely to search for regular jobs less intensively and that they have higher reservation wages and so are more selective in accepting job offers. However, a not of caution about state transfers is required here since its estimated effect on the exit rate from unemployment can inform about wrong policy decisions. The point is that in most presented models pension is combined with stipend and various kinds of social assistance in one category 'State transfers', but as has been discussed earlier it is preferable to control for behavior of unemployed pensioners separating them from the other recipients of state transfers. When we add two dummies 'Pension' and 'Other state transfers' instead of one dummy 'State transfers' to the model(Model (6)), it appears that only the coefficient on 'Pension' is highly significant and larger by the magnitude while the coefficient on 'Other state transfers' is not significant. This finding shows that the behavior of unemployed pensioners on the labor market is really different from the behavior of their counterparts who do not receive pension. Returning to Boeri's hypothesis about the role of non-employment benefits for the outflows from unemployment (Boeri, 2001), we may conclude that unemployment benefits as well as social assistance measures are not significant determinants of unemployment duration in Ukraine.

Surprisingly, people relying on income from dividends, rents, interests, savings, *etc*. tend to have significantly shorter unemployment spells. The observed positive effect may be in part due to observed or unobserved characteristics which can explain stronger attachment of such individuals to the labor market (*e.g*. age, marital status, education, importance of employment status and fear of being unemployed and without money, *etc*.), *i.e*. due to endogeneity of this type of income.

Previous wage incorporated in model (5) (Table 9*a*) seems to have no effect on unemployment duration, but we would not rely on these results that much since we have information on wages only for half of our sample. Moreover, it comes from the retrospective part and so is subject to significant reliability problem (Sudman and Bradburn, 1973).

Other surprising result from our study is that previous labor market state before unemployment (as well as a sector of previous employment and employment status) and previous unemployment experience do not alter the probability of leaving unemployment to jobs with the only exception of the experience of three or more prior unemployment spells the coefficient on which is positive and marginally significant at the 10% level. Our interpretation for this from the individuals' side is that individuals with many unemployment spells are more mobile on the labor market and can find the

next job relatively easy, and that previously inactive persons have lower reservation wage that those previously employed. It is difficult to interpret these results from the employers' side, but we guess that employers use other information as a signal of worker's productivity and reliability but not his labor market history.

The local labor demand variables proxied in our model by the regional unemployment rate (oblast-level quarterly registered unemployment rate in all models except Model (4) with yearly ILO-type unemployment rate) and the type of settlement have the expected signs. In model (3), the implied effect of a one percentage point increase in the registered unemployment rate is a 7.3 percent reduction in the hazard to job (response of the hazard to a one percentage increase in the ILO-type unemployment rate is about 3.6 percent decline). The residents of large cities (more than 500 thousands of inhabitants) have higher probabilities to leave unemployment for employment than those living in the rural area or very small towns. This suggests that local labor market conditions are important determinants of exit to jobs and that unemployment duration in a country might be lower if fewer barriers such as registration (just new name for the old system of *propiska*), high transportation and housing expenses existed for people to move to regions where labor market conditions were more favorable.

Finally, all specifications for the exits from unemployment to employment reveal that macroeconomic environment (proxied by the year of entering unemployment) and the starting season of unemployment seem to be not important for the determining unemployment duration before re-employment. Only those who became unemployed in 2002 have significantly higher hazards of exit to jobs compared to the reference group (those who entered unemployment in 1997). One potential explanation for non-response of the unemployment duration to economic growth in Ukraine is that there are serious barriers between unemployed and job opportunities (as has been discussed in the Introduction and Section 3) and that unemployment in Ukraine has at most structural character during the last years. Another potential explanation is that like in the CEE countries during the 90-s, employment growth in the old sector absorbs first of all 'hidden' unemployed who remain formally attached to a work place, while for the jobs created in the new sector unemployed have to compete with those still employed in the old sector (Blanchard, 1997).

When we turn to the multivariate analysis of the factors affecting exits from unemployment to economic inactivity (Table 9*b*), several primary results emerge. First, there is no significant difference by education, gender, marital and family status, regional unemployment rate, and previous unemployment experience.

Second, as we expected, younger workers have a significantly smaller hazard rate to inactivity than both prime-age or older individuals. This may be attributed to the fact that older persons are more inclined to retire and stop job search process, or that they can have some health problems or some other attributes that can lead to the smaller job search intensity or the loss of hope of finding a job (discouragement).

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inclined to retire and stop job search process, or that they can have some health problems or some other attributes that can lead to the smaller job search intensity or the loss of hope of finding a job (discouragement).

Third, individuals entering unemployment after employment appear to search longer before withdrawing from the labor force than individuals being economically inactive before unemployment. The reason for this is perhaps higher importance of work and more negative reasons associated with not having a work and being idle for previously employed. Also they may anticipate their relative advantage in finding a job and so don't want to leave the labor market.

Fourth, we observe longer unemployment durations before withdrawing from the labor force for residents of small to medium towns compared to residents of rural area or very small towns, and no significant difference in unemployment durations between residents of cities and the latter. One of the possible explanations is that residents of rural area can at least move to self-employment (subsidiary agriculture) or leave the labor market in the case of unsuccessful search of 'paid' employment, while residents of small to medium towns stay unemployed longer hoping to find a regular job subject to the limited number of alternative activities.

Fifth, persons relying on household income and pension during unemployment are more likely to leave the labor force than persons without alternative income support since the former have less financial incentives to actively search for job and work at all. Significant effect of presence of income from casual work activities with respect to the exit to employment accompanied with its insignificant impact with respect to the exit to inactivity indicates that various casual work activities mainly in the informal sector and subsidiary farming can be considered as simply survival measures taken by those who would prefer the stability of a formal regular job but with a reasonable remuneration.

Finally, year and quarter coefficients imply that the hazard of exit from unemployment to inactivity increases with moving to the later year of starting unemployment and that those who enter unemployment in the second quarter tend to withdraw from the labor market faster than those who start unemployment in the first quarter, but we think that this result is more related to the disadvantages of retrospective data and classification errors rather than to some changes in macro environment inducing increased outflows to inactivity during the recent years.

Table 9*d* presents the value of the baseline hazard parameters defined in equation (4). Hazard to inactivity is rather smooth and very close to zero, while hazard to employment has several spikes and is relatively high after 4 years but few spells last sufficiently long to be affected by this sudden increase in the hazard. Furthermore, as Meyer (1990) concludes, "whatever the source of the spikes in the hazard, the baseline hazard parameters have identified an important feature of the data that would have been missed if a simple parametric baseline has been estimated. Anomalies in the hazard that remain after including covariates suggest variables to add or data problems to examine". And this will be the area for our further research.

Table 9*d*. Baseline hazard estimates from specification (3) in Tables 9*a*–9*c*

Month	Exits to jobs, multiple spells (Table 9*a*)		Exits to inactivity, multiple spells (Table 9*b*)		Exits to jobs, single spell (Table 9*c*)	
	Hazard	Std. Error	Hazard	Std. Error	Hazard	Std. Error
1	0.016	(0.005)	0.000	(0.000)	0.016	(0.006)
2	0.100	(0.023)	0.001	(0.001)	0.092	(0.026)
3	0.094	(0.022)	0.002	(0.001)	0.088	(0.025)
4	0.080	(0.019)	0.003	(0.001)	0.085	(0.024)
5	0.066	(0.016)	0.002	(0.001)	0.060	(0.018)
6	0.074	(0.018)	0.002	(0.001)	0.056	(0.017)
7	0.070	(0.017)	0.003	(0.001)	0.061	(0.018)
8	0.050	(0.013)	0.001	(0.001)	0.051	(0.016)
9	0.052	(0.014)	0.002	(0.001)	0.054	(0.017)
10	0.052	(0.014)	0.002	(0.001)	0.042	(0.014)
11	0.051	(0.014)	0.004	(0.002)	0.048	(0.016)
12	0.076	(0.020)	0.003	(0.001)	0.067	(0.021)
13	0.068	(0.018)	0.010	(0.004)	0.056	(0.018)
14	0.049	(0.014)	0.002	(0.001)	0.055	(0.019)
15	0.051	(0.015)	0.002	(0.001)	0.041	(0.015)
16	0.034	(0.012)	0.002	(0.001)	0.030	(0.012)
17	0.053	(0.016)	0.003	(0.001)	0.041	(0.015)
18	0.048	(0.015)	0.001	(0.001)	0.039	(0.015)
19	0.042	(0.014)	0.001	(0.001)	0.033	(0.013)
20	0.046	(0.015)	0.001	(0.001)	0.042	(0.016)
21	0.052	(0.016)	0.002	(0.001)	0.048	(0.018)
22	0.063	(0.019)	0.002	(0.001)	0.049	(0.018)
23	0.081	(0.023)	0.002	(0.001)	0.051	(0.019)
24	0.043	(0.015)	0.004	(0.002)	0.036	(0.015)
25	0.042	(0.015)	0.006	(0.003)	0.047	(0.019)
26	0.040	(0.015)	0.004	(0.002)	0.045	(0.018)
27	0.042	(0.016)	0.003	(0.002)	0.036	(0.016)
28	0.048	(0.017)	0.002	(0.002)	0.032	(0.015)
29	0.051	(0.019)	0.003	(0.002)	0.057	(0.023)
30	0.055	(0.020)	0.002	(0.001)	0.043	(0.019)
31	0.031	(0.014)	0.005	(0.003)	0.038	(0.018)
32	0.033	(0.015)	0.005	(0.003)	0.040	(0.019)

Month	Exits to jobs, multiple spells (Table 9*a*)		Exits to inactivity, multiple spells (Table 9*b*)		Exits to jobs, single spell (Table 9*c*)	
	Hazard	Std. Error	Hazard	Std. Error	Hazard	Std. Error
33	0.065	(0.023)	0.005	(0.003)	0.065	(0.027)
34	0.044	(0.019)	0.003	(0.002)	0.038	(0.019)
35	0.059	(0.023)	0.011	(0.005)	0.056	(0.025)
36	0.043	(0.019)	0.011	(0.005)	0.051	(0.024)
37	0.046	(0.021)	0.009	(0.005)	0.037	(0.021)
38	0.066	(0.027)	0.006	(0.004)	0.069	(0.031)
39	0.088	(0.033)	–		0.074	(0.033)
40	0.084	(0.032)	0.004	(0.003)	0.055	(0.028)
41	0.069	(0.030)	0.004	(0.003)	0.069	(0.033)
42	0.073	(0.031)	0.002	(0.002)	0.061	(0.031)
43	0.090	(0.037)	0.006	(0.004)	0.064	(0.033)
44	0.037	(0.022)	0.009	(0.005)	0.028	(0.021)
45	0.026	(0.019)	0.005	(0.004)	0.030	(0.022)
46	0.056	(0.030)	0.005	(0.004)	0.063	(0.035)
47	0.075	(0.037)	–		0.068	(0.038)
48	0.064	(0.035)	0.009	(0.006)	0.054	(0.034)
49	0.069	(0.037)	0.013	(0.008)	0.038	(0.028)
50	0.095	(0.046)	0.014	(0.009)	0.105	(0.053)
51	0.089	(0.047)	0.013	(0.009)	0.074	(0.046)
52	0.049	(0.036)	0.009	(0.007)	0.053	(0.039)
53	0.103	(0.056)	0.016	(0.011)	0.083	(0.052)
54	0.085	(0.052)	0.024	(0.015)	0.090	(0.057)
55	0.158	(0.077)	0.014	(0.011)	0.169	(0.085)
56	0.111	(0.068)	–		0.119	(0.075)
57	0.040	(0.040)	0.009	(0.009)	0.043	(0.043)
58	0.087	(0.063)	0.019	(0.015)	0.094	(0.070)
59	0.250	(0.120)	–		0.214	(0.117)
60	0.185	(0.114)	0.029	(0.023)	0.193	(0.122)
61	–		0.063	(0.042)	–	
62	0.307	(0.186)	–		0.322	(0.198)
63	0.271	(0.200)	–		0.291	(0.219)
64	0.662	(0.356)	0.085	(0.067)	0.723	(0.399)
65	0.800	(0.583)	0.223	(0.188)	0.876	(0.640)

6. CONCLUSIONS

This paper has analyzed unemployment duration in Ukraine between 1997 and 2003 using a new rich nationally representative data set from the Ukrainian Longitudinal Monitoring Survey. Given the absence of an effective system of public employment services and unemployment insurance in Ukraine, this study tries to identify other potential determinants of unemployment duration.

We used semiparametric estimation techniques and compared it to alternative approaches. Our analysis has shown that there is huge heterogeneity among unemployed in the sample. Estimates from all specifications show that men do not appear to have significantly higher re-employment probabilities than women; married are more likely to leave unemployment to employment than not married persons while married women remain unemployed considerably longer than other groups; the older an individual the lower its probability of re-employment but the higher probability of exit to inactivity; unemployed with higher education tend to find jobs more quickly than individuals with unfinished secondary education; residents of large cities have higher exit rates to jobs than residents of rural area or small towns while residents of small to medium towns have lower exit rates to inactivity; the higher regional unemployment the lower the probability of re-employment; previous labor market history does not influence significantly the probability of re-employment, but previous labor market state seems to have significant effect on the probability of exit to inactivity. Additionally, individuals receiving unemployment benefits do not have significantly different durations with respect to exit to both destinations. Individuals who receive alternative income from casual work activities and subsidiary farming or rely on household income or pension remain unemployed considerably longer before finding a regular job. At the same time, pension and household income as the sources of subsistence encourage people to leave the labor force faster. Our results suggest that on average low non-employment benefits in Ukraine cannot be considered as the significant determinants of unemployment duration in contrast to the Boeri's hypothesis (Boeri, 2001). We unfortunately lack empirical evidence in order to judge for sure what factors are of the primary importance for explanation of stagnancy of unemployment in Ukraine but it seems that local demand constraints, measured by the regional unemployment rate and type of settlement, have the same or even lower importance now than the supply-side effects. Furthermore, according to our estimation results economic upturn in Ukraine during the last years appears to not influence the unemployment duration implying that a temporary shock in the early 90-s has brought long-lasting effects in terms of high and persistent unemployment and that unemployment in Ukraine during the last years can be characterized as mainly structural.

Therefore, our study shows that long-term unemployment remains an important issue in Ukraine even in stronger labor market conditions after economy's reversal, and that long-term unemployment is very unevenly distributed among various subgroups of population. What policy implications can be derived from our results? Beyond doubt, the policy goal should be to reduce the unemployment rate rather than to increase outflow rate from unemployment *per se*. Taking into account that incidence of long-term unemployment tends to fall slowly in response to economic growth, as we noted in the introduction and this point was supported by our data, it is important also

to expand policy measures aimed at decreasing inflow to unemployment and perhaps at increasing outflow to inactivity. This would suggest also adopting demand-side and supply-side measures targeted at those who are at risk of remaining unemployed in the long term while they are employed or if the persons just entered unemployment.

According to our study, for example, persons of pre-retirement age or older have lower exits rates to employment and higher exit rates to inactivity. Given this finding along with the positive effect of education on re-employment prospects, we see several possible directions to move. Firstly, in order to prevent long-term unemployment and increase re-employment probabilities of persons with obsolete skills from the pre-retirement age group (aged from 45 to 53) it is recommended to provide such programs as retraining and upgrading the skill level, stressing that these programs should focus on skills needed by employers and that the methodology and timing of training courses has to suit the needs of adults.[48] Apart from training programmes for unemployed, measures and incentives are needed to encourage employers to invest in on-the-job training of their employees in order to avoid obsolescence of skills, especially in the case of older workers. Secondly, since one of the worse developments in the Ukrainian labor market is age discrimination, more intensive assistance with job search and measures to increase employer recruitment of older workers (*e.g.* recruitment subsidies, tax benefits, partial compensation for paid sick leave benefits, *etc*.) are of vital importance. It should be taken into account also that many workers from the pre-retirement age group are searching for jobs not only for a source of income but also and sometimes more importantly because they lack the years of service necessary to be entitled to a pension (usual or early). Therefore, it is critical to simplify the recording system of years of service by moving from the current practice of keeping records in a labor book towards the system of accumulating information attached to an individual social insurance number. This would facilitate to build up entitlement to a pension or social benefits for each economically active person, regardless of the type of his/her economic activity and employment status. As far as persons entitled to an early or usual retirement pension are concerned, the best cost-effective instrument for reducing long-term unemployment among them seems to be an increase of pension benefits up to the necessary subsistence minimum, which would encourage most elderly persons to move out of the labor force.

Another important finding is that like in most transition and developed countries better educated individuals have higher re-employment probability than their less educated counterparts. This indicates that the Ukrainian labor market moves in the right direction recognizing the importance of education and accumulated human capital as a determinant of an economy's growth and international competitiveness. In view of these developments, both enhancing the education and skill levels of workers and finding the most effective ways of doing so should become of central importance in economic, social and employment strategies. Educational policy should stress the significance of a broader-based curriculum and develop high-quality flexible and widely marketable skills in order to improve the chance of smooth transition from studies to jobs. In order to boost

[48] Surely we can expect that the persons of pre-retirement age may heavily resist to retraining but it seems that there are no other alternatives to make them employed.

outflows from unemployment or reduce inflow to unemployment for new labor market entrants it is recommended to focus not only on the increasing number of graduates with a certain degree obtained after some educational institution but also and more importantly on the quality of education and actual accumulated human capital. The risk of gross wastage of resources could be minimized by reaching agreements with employers who promise to hire students or trainees, as happens frequently in other transition countries.

Our empirical findings also indicate that unemployed persons living in the regions with poor regional labor market conditions tend to stay in the unemployment pool longer before employment, *ceteris paribus*. A possible lesson for Ukraine from the experience of developed countries is that it may not be cost-effective to promote the recovery of depressed areas with mobility grants or regional investment subsidies. Instead, efforts should focus on removing barriers to voluntary mobility, spreading more information about vacancies and living costs throughout the country, and improving the infrastructure, transport and housing market (including development of mortgage loaning system). The Government should also encourage the creation of new jobs and the establishment of new firms in depressed areas through preferential credits and tax concessions, management training and business counseling, subsidies for research and development, access to new technologies, subsidies for human capital upgrading or retraining of permanent workers who are at risk of losing their jobs, assistance in marketing and sales, *etc*. If the prospects of changes in the short-run are limited and negative social and political externalities of mass dismissal and closure of unprofitable enterprises are large, temporary policies that support existing enterprises may make sense. It is essential that any industrial-support policy should stipulate sanctions to ensure that enterprises use the support for effective economic restructuring rather than for further delaying the solution of their economic and employment problems.

Although the largest part of unemployed in our sample rely primarily on household income as a source of subsistence during an unemployment spell which tends to lower the probability of finding a job, it doesn't seem to be a problem since it also encourages exit to inactivity. However, recipients of income from various kinds of casual activities and subsidiary farming — the second largest group by the priority of sources of subsistence — are likely to stay unemployed before re-employment significantly longer than their counterparts while their expected durations before withdrawing from the labor force do not differ significantly. Alternative income raises their reservation wages and lowers search intensity and so such individual experience significantly longer unemployment spells than people not having such possibilities. Thus, the possibility of having different casual work, business activities or subsidiary farming can be one of the possible explanations of stagnant unemployment in Ukraine. This raises a great concern at macro level as well as at the level of individuals over the potential for such persons to be disproportionately represented among long-term unemployed: at macro level it may lead to development of shadow economy at a greater scale, and at individual level it may cause deterioration of work skills and discipline. Since it is almost impossible to directly control and influence engagement into casual work activities, it would be more appropriate to pursue an economic and social policy which promotes full, productive and freely-chosen employment. This would encourage people to move

from inefficient to efficient jobs, from informal casual activities towards the formal sector, and from unemployment to regular jobs. Having in mind the potential contribution of the small and medium enterprise sector towards generating productive and sustainable jobs, we would recommend more intensive development of an effective network of institutions providing support to the small and medium enterprises and creating stable regulatory, financial and political environment in Ukraine. At the same time, there is a need for stricter monitoring of job searches among the registered unemployed and applying punitive measures to those of them who receive income from irregular work. These punitive measures could take the form of disqualification from unemployment benefits and any state-provided labor market programme or complete removal from the unemployment register.

Finally, it should be taken into account that a relatively small fraction of jobless individuals register with public employment centers or stay in a register after exhaustion of unemployment benefits and so few of actually long-term unemployed are eligible for various active labor market policies which are provided by the Public Employment Service. Consequently, it is recommended to simplify the registration procedures, increase unemployment benefits to a reasonable level and make various measures provided by the employment centers more attractive for the unemployed in order to stimulate individuals to register with the employment center. Experience in some transition countries has shown that another good motive for unemployed to register (even if people would otherwise not wish to do so) is to base the health care system on insurance principle: compulsory health insurance contributions would be covered by the state only when people of working age are full-time students, disabled or registered jobseekers.

Unfortunately, we do not have necessary information to make a rigorous analysis of the effect of various features of the unemployment benefit system in Ukraine on the re-employment probabilities that can provide important policy implications. Also in spite of controlling for observed individual heterogeneity, we cannot be sure of the extent to which the pattern of duration dependence we have found (with an increase in the hazard during the first year, its slight decrease during the next three years followed by its gradual increase) reflects true duration dependence. For the moment, we would suggest that more attention should be paid to the exit rates corresponding to the several first months, since they are based on a more representative sample, but this issue certainly requires additional empirical assessment.

APPENDICES

A1. Unemployment insurance system in Ukraine: regulatory framework

The main principles of unemployment benefit (insurance from 2001) system in Ukraine are set forth in the Law on Employment (came into effect in 1991), the Law on Compulsory State Social Unemployment Insurance (came into effect in 2001) and some auxiliary elements of the law which regulate relations connected with unemployment insurance. According to the Law on Compulsory State Social Unemployment Insurance only those individuals who are officially registered as unemployed with a local employment center can be eligible for unemployment benefits.

Under the Law of Ukraine on Employment the unemployed are working-age, able-bodied persons who are without work and earnings, are registered with state employment center as looking for a job, able and ready to start a suitable job (Article 2). The unemployment status is granted on the eighth day after applying to the local employment center. The unemployed status is denied to persons under sixteen (with exception of those who worked before and were laid off), to persons looking for their first job if they had no profession or skill and if they refused an offer of vocational training or of gainful employment, to persons eligible for pension according to the legislation, and to persons who within 7 days after registration with a local employment center as looking for a job rejected two offers of suitable job.

The unemployment benefit is paid from the eighth day after the date of registration in the PES till re-employment but duration of unemployment benefit payment is limited to 360 days during two years for the majority of the unemployed, to 720 days for people of pre-retirement age (men of 58 or older and women of 53 or older), and to 180 days for uninsured individuals with unemployment status looking for their first work and for some categories of dismissed military employees. If a person is registered as unemployed for a second time during two years, duration of unemployment benefit payment during the second unemployment spell is calculated as the residual from the maximum specified duration during two years and actual duration of unemployment benefit payment during the first unemployment spell.

To remain in the register and to receive unemployment benefits without suspension or reductions up to 90 days an unemployed must report to the local employment center once a month, follow recommendations of the employment center aimed at encouraging employment, not refuse two offers of a suitable job or an offer of training/retraining, not refuse a job offer with new qualifications after retraining, not leave training/retraining courses without valid reason, and not conceal information about temporary employment while receiving unemployment benefits. If a person voluntarily quitted a job without strong reasons or he/she was dismissed for disciplinary reasons, payment of unemployment benefits begins from the 91-st day after registration. Benefits are also postponed up to 3 months to individuals receiving severance payment and other payments after lay-offs. Unemployment benefits can be paid as a lump sum to unemployed individuals older

than 18 who intend to start their own business after approving their business-plans by the special committee of the employment center and their registration as a subject of entrepreneurial activity (physical or juridical entity) in the State Tax Administration.

According to the Law on Compulsory State Social Unemployment Insurance size of unemployment benefit depends on the reason of unemployment, length of unemployment insurance payment (equal to sum of work experience before 2001 and length of actual unemployment insurance payment from 2001), average wage at the previous work and duration of unemployment.[49]

1) If an insured person worked (including various forms of employment) and paid unemployment insurance contributions for at least 26 weeks during the last 12 months before the unemployment period, was laid off by independent of him reasons, is registered on general conditions and is entitled to unemployment benefits, the size of his unemployment benefit is calculated as a percentage of his average wage at the previous work depending on the length of unemployment insurance payment according to the following scheme:

Length of unemployment insurance payment	Intermediate size of Unemployment benefits as a percentage of average wage (IUB)
Less than 2 years	50%
From 2 to 6 years	55%
From 6 to 10 years	60%
More than 10 years	70%

Then, depending on duration of unemployment spell the final size of benefits is defined as a percentage of the specified amount IUB: 100% during first 90 days, 80% during the following 90 days, and 70% afterwards. As a result, pattern of defining the size of unemployment benefits as a percentage of the average wage at the previous work can be expressed as shown in the table below.

[49] Before the Law on Compulsory State Social Unemployment Insurance came into effect in 2001, size of unemployment benefit depended on the reason of unemployment (the same categories as now), average wage at the previous work and duration of unemployment (only for laid-off persons for economic reasons), but not on the length of actual unemployment insurance payment (or, in other words, work experience). So if persons were laid-off by economic reasons and worked for at least 26 weeks during the last 12 months before the unemployment period, replacement rate was 100% during first 60 days, 75% during the following 90 days and 50% during 210 days; if persons worked less than 26 weeks they were eligible to unemployment benefits of no less than 50% of their previous wage; and all other persons were eligible for the established minimum level of unemployment benefits.

Length of unemployment insurance payment	Duration of unemployment	Size of Unemployment benefits as a percentage of average wage
Less than 2 years	First 90 days	50%
	Following 90 days	40%
	The rest	35%
From 2 to 6 years	First 90 days	55%
	Following 90 days	44%
	The rest	38.5%
From 6 to 10 years	First 90 days	60%
	Following 90 days	48%
	The rest	42%
More than 10 years	First 90 days	70%
	Following 90 days	56%
	The rest	49%

However, unemployment benefits cannot exceed the regional average wage in the previous month and cannot be lower than the subsistence minimum.

2) If an insured person worked (including various forms of employment) and paid unemployment insurance contributions for at least 26 weeks during the last 12 months before the unemployment period, has quitted a job without strong reasons, is registered on general conditions and is entitled to unemployment benefits, the size of his unemployment benefit is calculated by the same scheme as in p.1) but payment of unemployment benefits starts from the 91-st day at the amount of 80% of the specified amount IUB.

3) The size of benefits paid to all other categories (insured as well as uninsured, including those who were dismissed for disciplinary reasons; those who worked or paid unemployment insurance contributions for less than 26 weeks in the last 12 months before becoming unemployed; those who are willing to reenter employment after a long (more than six months) break; those who worked or were engaging in entrepreneurial activity at least 26 weeks in the last 12 months before becoming unemployed, didn't pay unemployment insurance contributions but have work experience (equated to insurance experience) or insurance experience acquired before; those who are seeking for a job for the first time and have no insurance experience; some categories of dismissed military employees, *etc*.) doesn't depend on the length of unemployment insurance payment and is set at the level of the subsistence minimum established by the law.

4) Persons who worked or were engaging in entrepreneurial activity at least 26 weeks in the last 12 months before becoming unemployed, didn't pay unemployment insurance contributions and don't

have work experience (equated to insurance experience) or insurance experience acquired before are not eligible for unemployment benefits.

If unemployed persons attend training or retraining courses, they are eligible for a stipend at the level of unemployment benefit calculated according to the above rules but the size of their stipend can not be changed during training course depending on the duration of unemployment spell and is equal to the size defined at the beginning of training program. Duration of stipend payment is scored up to the general duration of unemployment benefits payment and cannot exceed it.

If unemployed workers have less than one and a half years until legal retirement age, they may be provided with a regular pension instead of unemployment benefits at the expense of the Unemployment Insurance Fund.

Persons registered as unemployed who have already exhausted their unemployment insurance benefits are entitled to unemployment assistance if the average per capita income in their families does not exceed the level of the subsistence minimum established by the law. Unemployment assistance to the unemployed is paid at the monthly level of 75% of the subsistence minimum during 180 days.

Persons who have already exhausted their unemployment benefits and unemployment assistance or their non working-able dependants can be eligible to one-off cash payment at the level of 50% of the subsistence minimum. In the case of death of an unemployed person or his/her dependant, the funeral assistance in the amount of one subsistence minimum is given to his/her relatives.

A2. Example of retrospective questions from the Individual questionnaire of the ULMS-2003

Section C. Main jobs in 1986, 1991, 1997, 1998–2003

Now we would like to talk to you about your main jobs from 1986 to 2003. The aim of the present survey is to identify the changes in the employment of the population of Ukraine. The questions that you are asked concern your relations to work starting from 1986. We will ask you questions about your work-related activities in 1986 (the year when Chernobyl catastrophe happened), in 1991 (the year when Ukraine became independent), and over the last years from December 1997 to March (April, May) 2003.

Irregular jobs should not be described in the retrospective part.

We will fill out this work history so that we can visualize your work since 1986. For the period 1998 – March (April, May) 2003 we are interested in a complete account of your work-related activities.

INTERVIEWER!

1. ASK THE QUESTIONS FROM TOP TO BOTTOM FOR ONE TIME PERIOD STARTING FROM THE COLUMN 1 UNTIL THERE IS A TRANSFER TO ANOTHER TIME PERIOD (NEXT COLUMN).
2. PRECISELY FOLLOW THE INSTRUSTIONS AND TRANSFERS.
3. WHEN YOU HAVE ASKED THE LAST QUESTION FOR 1986 AND THERE IS NO INSTRUCTION TO SKIP TO ANOTHER SECTION, START ASKING THE SAME QUESTIONS FOR DECEMBER 1991 (COLUMN 2), EVEN IF RESPONDENT HAD OTHER JOBS WITHIN THE PERIOD FROM JANUARY 1987 TO NOVEMBER 1991. THE SAME IS FOR THE PERIOD JANUARY 1992 – NOVEMBER 1997.
4. ALL THE JOBS SHOULD BE COVERED FOR THE PERIOD FROM 1998 TO 2003 (SEE THE MANUAL).

C01. To begin with, please, try to remember the year and month you started your first job?

Month |__|__| Year |__|__| DS…997 RA…999

NEVER WORKED…..9999 → SKIP TO **D01A**, COLUMN 1

IF RESPONDENT STARTED HIS/HER FIRST JOB

AFTER DECEMBER 1986 ….996 → SKIP TO **D01A**, COLUMN 1

BEFORE OR IN DECEMBER 1986 …..998 → CONTINUE **C02A**

C02. Did you have a job in December 1986 (December 1991, December 1997, NAME THE TIME PERIOD)? This includes employment in entrepreneurship, business activities or individual work; working in a family enterprise or on a farm, or as a freelancer.

A. In December 1986 1 – Yes → **SKIP TO C03A** 2 – No → **SKIP TO D01A** |__| DS…7 RA…9

B. In December 1991 1 – Yes → **SKIP TO C03B** 2 – No → **SKIP TO D01B** |__| DS…7 RA…9

C. In December 1997 1 – Yes → **SKIP TO C03C** 2 – No → **SKIP TO D01C** |__| DS…7 RA…9

		Dec. 1986	Dec. 1991	Dec. 1997	1998–2003	1998–2003	1998–2003
		1	2	3	4.1	4.2	4.3
C03	In what *enterprise/organization* or business activities did you have your main job in December 1986 (December 1991, December 1997, from 1998 to 2003)? If you know, please, also specify its legal form. [RECORD NAME OF ENTERPRISE/ORGANIZATION OR SPECIFY BUSINESS ACTIVITY]						
A	In December 1986 → FILL IN COL. 1. REGISTER THE ANSWER IN COLUMN 1 AND GO TO C04. ASK THE QUESTIONS IN COLUMN 1 UNTIL THERE IS A TRANSFER TO THE NEXT COLUMN						
B	In December 1991 → FILL IN COL.2,	DS…7	DS…7	DS…7	DS…7	DS…7	DS…7
C	In December 1997 → FILL IN COL.3	RA…9	RA…9	RA…9	RA…9	RA…9	RA…9
D	What was your next main job? → FILL IN COL.4.1–4.3						

		Dec. 1986	Dec. 1991	Dec. 1997	1998–2003	1998–2003	1998–2003
		1	2	3	4.1	4.2	4.3
C04	Did you leave this job more than for a month [including for studies (except training), parental leave, military services] or for another job? 1 Yes→ GO DOWN THE COLUMN 2 No→ SKIP TO SECTION E DS…7 RA…9	|__|	|__|	|__|	|__|	|__|	|__|
C10	Tell me, please, when did you start this job?						
A	Month DS…997 NA…999	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|
B	Year DS…997 NA…999	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|
C25	When did you leave this job?						
A	Month DS…997 RA…999	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|
B	Year DS…997 RA…999	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|	__|__|
	INTERVIEWER CHECKPOINT (MARK CODE) 1 RESPONDENT LEFT THIS JOB BEFORE DECEMBER 1991 → GO TO C02B (COLUMN 2)	|__|	|__|	|__|	|__|	|__|	|__|
	2 RESPONDENT LEFT THIS JOB BETWEEN DECEMBER 1991 AND DECEMBER 1997 → GO TO C02C (COLUMN 3) 3 RESPONDENT LEFT THIS JOB AFTER DECEMBER 1997 → CONTINUE DOWN THE SAME COLUMN						
C37	After you left this enterprise/organization, did you start working in a new job within one month, or was there a period during which you did not have work? 1 Started working at once → GO TO C03D 2 Did not start working → SKIP TO D01D	|__|	|__|	|__|	|__|	|__|	|__|

Section D. Non-employment spells in 1986, 1991, 1997, 1998–2003

		Dec. 1986	Dec. 1991	Dec. 1997	1998–2003	1998–2003	1998–2003
		1	2	3	4.1	4.2	4.3
D01	Now let's talk about the (following) period during which you did not work.	__|__|	__|__|	__|__|	__|__|	__|__|	__|__|
A	What were you doing in December 1986? → FILL IN COL. 1	__|__|	__|__|	__|__|	__|__|	__|__|	__|__|
B	What were you doing in December 1991? → FILL IN COL. 2	__|__|	__|__|	__|__|	__|__|	__|__|	__|__|
C	What were you doing in December 1997? → FILL IN COL. 3	__|__|	__|__|	__|__|	__|__|	__|__|	__|__|
D	What were you doing during this period of non-employment (1998–2003)? → FILL IN COL. 4.1–4.3	__|__|	__|__|	__|__|	__|__|	__|__|	__|__|
	CHART D01	__|__|	__|__|	__|__|	__|__|	__|__|	__|__|
D02	When did the period start and end during which you did not work (period of non-employment)?						
	Month, year start DS…997 RA…999	Start __|__|__|__|	Start __|__|__|__|	Start __|__|__|__|	Start __|__|__|__|	Start __|__|__|__|	Start __|__|__|__|
	Month, year end DS…997 RA…999	End __|__|__|__|	End __|__|__|__|	End __|__|__|__|	End __|__|__|__|	End __|__|__|__|	End __|__|__|__|
	Period of non-employment continues…998						
D03	What were your sources of subsistence at this time? [MULTIPLE ANSWERS ARE PERMITTED] CHART D03 **A***	__|__|	__|__|	__|__|	__|__|	__|__|	__|__|
D04	Which of these was your main source of subsistence? [USE CODES FROM CHART D03, ONLY ONE ANSWER] 97 DS 99 RA	__|__|	__|__|	__|__|	__|__|	__|__|	__|__|

		Dec. 1986	Dec. 1991	Dec. 1997	1998–2003	1998–2003	1998–2003
		1	2	3	4.1	4.2	4.3
D05	INTERVIEWER CHECKPOINT WHEN DID THE PERIOD END? [SEE D02] 1 PERIOD ENDED BEFORE DECEMBER 1991 → GO TO C02B 2 PERIOD ENDED BETWEEN DECEMBER 1991 AND DECEMBER 1997 → GO TO C02C 3 PERIOD ENDED AFTER DECEMBER 1997 OR DID NOT END → CONTINUE	|__|	|__|	|__|	|__|	|__|	|__|
D06	Were you seeking and available for work for any time during this period after December 1997? 1 Yes 2 No → SKIP TO D10 7 DS 9 RA *NB! Seeking a job also includes preparations for starting entrepreneurship / a farm and waiting for an earlier contracted job to start.*	|__|	|__|	|__|	|__|	|__|	|__|
D07	From which month, year to which month, year were you seeking work? 997 DS 999 RA	Start of period 1 |_|_|_|_| End of period 1 |_|_|_|_| Start of period 2 |_|_|_|_| End of period 2 |_|_|_|_| Start of period 3 |_|_|_|_| End of period 3 |_|_|_|_|	Start of period 1 |_|_|_|_| End of period 1 |_|_|_|_| Start of period 2 |_|_|_|_| End of period 2 |_|_|_|_| Start of period 3 |_|_|_|_| End of period 3 |_|_|_|_|	Start of period 1 |_|_|_|_| End of period 1 |_|_|_|_| Start of period 2 |_|_|_|_| End of period 2 |_|_|_|_| Start of period 3 |_|_|_|_| End of period 3 |_|_|_|_|	Start of period 1 |_|_|_|_| End of period 1 |_|_|_|_| Start of period 2 |_|_|_|_| End of period 2 |_|_|_|_| Start of period 3 |_|_|_|_| End of period 3 |_|_|_|_|	Start of period 1 |_|_|_|_| End of period 1 |_|_|_|_| Start of period 2 |_|_|_|_| End of period 2 |_|_|_|_| Start of period 3 |_|_|_|_| End of period 3 |_|_|_|_|

		Dec. 1986	Dec. 1991	Dec. 1997	1998–2003	1998–2003	1998–2003
		1	2	3	4.1	4.2	4.3
D08	What steps did you take in looking for a job during each period of unemployment? [MULTIPLE ANSWERS ARE PERMITTED] CHART D08/F11	Period 1–3 |__|__| |__|__| |__|__|	Period 1–3 |__|__| |__|__| |__|__|	Period 1–3 |__|__| |__|__| |__|__|	Period 1–3 |__|__| |__|__| |__|__|	Period 1–3 |__|__| |__|__| |__|__|	Period 1–3 |__|__| |__|__| |__|__|
D09	Did your last job search end up in *finding a job/starting a business*, are you continuing job search until now, or did you stop your search without finding a job? 1 *Found a job/started a business*→ SKIP TO D11 2 Continuing search→ SKIP TO D11 3 Stopped search 7 DS 9 RA	|__|	|__|	|__|	|__|	|__|	|__|
D10	*Why did you not search for a job*? *OR Why did you quit job search*? [MULTIPLE ANSWERS ARE PERMITTED] CHART D10	|__|__| |__|__| |__|__|	|__|__| |__|__| |__|__|	|__|__| |__|__| |__|__|	|__|__| |__|__| |__|__|	|__|__| |__|__| |__|__|	|__|__| |__|__| |__|__|
D10A	Which of these was your main way of searching for a job? [USE CODES FROM CHART D10, ONLY ONE ANSWER] DS…97 RA…99	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|
D11	How did the period of non-employment end? 1 You found a job which is in the reference week → GO TO E01 2 You found a job/started business activity which isn't in the reference week → GO TO C03D 3 Period of non-employment continues→ GO TO E01	|__|	|__|	|__|	|__|	|__|	|__|

A* —1 Unemployment benefits, 2 Training allowance, 3 Casual work, 4 Production and sale of allowance products from own land plot, 5 Income from casual business activities, 6 Pension, 7 Stipend or study loan, 8 Income of spouse, 9 Income of parents municipal institution, 10 Support from relatives, 11 Child allowance, 12 Alimony, 13 Social benefits, subsistence allowance, 14 Sale of property, 15 Income from rent, interests, dividends, 16 Loans, 17 Savings, 18 Supported by state or municipal institution, 19 OTHER [RECORD], 20 DS, 21 RA.

A3. Construction of the main variables for the transition analysis

Control questions for defining the labor market states in the retrospective part are C02, C04, D01, and D06. A person is considered *employed* at a given time-point if he/she did have a job (affirmative answer to the question C02) in the corresponding time period. A person is considered *unemployed* if he/she didn't have a job (negative answer to the question C02) but was seeking and available for work during some period after December 1997 (affirmative answer to the question D06). Finally, a person is defined as *inactive* if he/she didn't have a job (negative answer to the question C02) and wasn't seeking and available for work during some period after December 1997 (negative answer to the question D06) or if he/she was seeking and available for work during some period (affirmative answer to the question D06) but the period of non-employment (according to the question D02) is wider than that period of job-seeking (according to the question D07).

Control question for defining the labor market transition *from employment to non-employment* (inactivity or unemployment) is C37, while the control question for defining the inverse labor market transition *from non-employment to employment* is D11.

Spells of employment are determined by responses to the questions C10 and C25, information about *unemployment spells* comes from the responses to the question D07, and *spells of inactivity* are designed from the responses to the questions D02 and D07 (if the period of non-employment includes the period of unemployment, then the person is considered inactive between starting date of non-employment period and starting date of unemployment period, or between two periods of unemployment, or between ending date of the last unemployment period and ending date of non-employment period).

Information on the *sources of subsistence* during a period of non-employment is provided in the question D03. We construct the following five dummy variables on sources of subsistence:

- *Unemployment benefits* = 1 if D03_1 = 1 (unemployment benefits) or D03_2 = 1 (training allowance);
- *Casual work* = 1 if D03_3 = 1 (casual work) or D03_4 = 1 (production and sale of products from own land plot) or D03_5 = 1 (income from casual business activities) or D03_19 = subsidiary agriculture (additional text information is used);
- *Household income* = 1 if D03_8 = 1 (income of spouse) or D03_9 = 1 (income of parents) or D03_10 = 1 (support from relatives);
- *State transfers* = 1 if D03_6 = 1 (pension) or D03_7 = 1 (stipend or study loan) or D03_11 = 1 (child allowance) or D03_12 = 1 (alimony) or D03_13 = 1 (social benefits, subsistence allowance) or D03_18 = 1 (support by state or municipal institution). Additionally, *Pension* = 1 if D03_6 = 1 (pension);
- *Other sources of subsistence* = 1 if D03_14 = 1 (sale of property) or D03_15 = 1 (income from rent, dividends, *etc*.) or D03_16 = 1 (loans) or D03_17 = 1 (savings).

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